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CAN 7

On the cover

One of 7 drill jumbos used for driving the main power tunnel for the Bersimis Project. (See story on page 6). This one is working on the East heading of the Perini Co's section going toward the main powerhouse.

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Bersimis Power Bolsters Quebec Mining Development

BY JOSEPH E. SMALLWOOD

SOME authorities calculate that by 1975 the Province of Quebec will be the leading producer in Canadian mining.

The first factor in this prediction, of course, is the many proven rich mining areas, plus the province's favorable geological situation for the occurrence of rich mineral finds. Except for the relatively small area of the St. Lawrence River Lowlands and a portion of the Appalachian Mountains that extends into its South Eastern corner, the province consists nine-tenths of the Precambrian rock shield.

The second big factor is more abundant water power to run the smelters, hoists, crushers, conveyors — all the equipment necessary to get ore out of the ground and ready it for the market. And Quebec has power, well over half of all the developed water power in Canada. What's more, it ranks first in potential with a total possible production from a well-distributed network of water sheds of 26,500,000 horsepower.

Since the summer of 1952, the greatest single contribution to the power phase of Quebec's mining ascendancy is being created in the form of Hydro-Quebec's giant Bersimis River project, where an ultimate 1,900,000 h.p. is being harnessed at the very hub of the province's wheel of mineral fortune.

When the Bersimis job is completed about 1961, 400,000 h.p. will be travelling by underwater cable to Gaspe Copper Mines Limited in the Gaspe Peninsula. Another 400,000 h.p. will be coursing through the lines of the Shawinigan Water & Power Company's Saguenay River system to serve the rapidly developing Chibougamau mining camp. A result of this will make more power available for the rich asbestos operations in the Thetford Mines area in Quebec's Eastern Townships.

Not yet on the books for Bersimis power, but well worth consideration are the rich iron fields off to the North East. Despite the fact that all the present production from that source is being exported, large reserves were set aside by the Iron Ore Company of Canada IOCO has been working with Laval for use in this country. Furthermore, University in Quebec City toward a utilization of iron ore within the province.

This implies the development of an economic method of reducing iron ore in large quantities with electricity—and when that day of success arrives hydro-electric power from the Bersimis and its family of watersheds along the North shore of the St. Lawrence will take on new importance in the mining production of the province.

Taking a closer look at some of the more immediate users of Bersimis power we find that in the *Chibougamau region, Opemiska Copper Mines Ltd.

*Chibougamau, 25,000 square miles of which has yet to be prospected, experienced a boom in the 20's which was smothered by lack of power and an uneconomic transportation system.

THE PICTURES

(On the Left of Page)

1. When the Bersimis Project is complete, these falls at the foot of Lac Casse on the Bersimis River will disappear. About 2,000 yards up-river a giant dam will divert the water to a more utilitarian if less beautiful purpose—starting it on a course through an 8-mile tunnel to giant turbines and the production of 1,200,000 hydro electric horsepower.

2. 15,000 temporary horsepower. From St. Timothee, near Montreal, 400 miles down the St. Lawrence River and 80 miles into the bush wilderness, came the 3 generator units housed in this temporary powerhouse on the Bersimis Project.

Revitalized, they drive electric compressors supplying air power for hundreds of drills on the giant rock job that is Bersimis—punching an 8-mile tunnel and producing thousands of cubic yards of rock for dams. They power electric-driven shovels that muck out the broken rock, they light a new-born town of 5,000 men and several construction camps over an area of several hundred square miles. And when the job is over they will die—obsoleted in the cause of rearing 8 of the most powerful generators in the world at a point 20 miles down river.

3. At this spot is arising the largest of 2 dams required to impound 385 billion cubic feet of Bersimis water.

It will ultimately be 2,210 feet long, 900 feet wide at the base, and 40 feet wide at the crest—and will be of rock, earth and gravel fill construction, concrete faced.

At the left is a diversion channel necessary during construction to control the strong Bersimis flow.

Approximately in the centre is a concrete structure forming the intake for a diversion tunnel which conducts some of the water 1,700 yards down stream to the generators of a 15,000 h.p. hydro-electric installation which furnishes temporary power for the entire project.

4. Rock by the thousands of tons. This quarry must yield enough rock fill to build 2 dams, one 2,210 feet long, the other 1,035 feet long—both 200 feet high.

To keep up with the loading, hauling and dumping operation of heavy duty trucks and 4-yard electric shovels, several Bucyrus Erie well drills are used, as well as (on the right) two electric-driven, self-propelled Quarrymaster large diameter blast hole drills supplied by Canadian Ingersoll-Rand.

(On the Right)

1. **A powerhouse starts a journey.** To provide construction power for the Bersimis Project an obsolete plant from St. Timothee, 40 miles west of Montreal, was dismantled and floated 400 miles down the St. Lawrence River for re-erection on the job. Here a duo of paving breakers chip concrete to release a turbine casing.

2. To increase the consolidation of the two dams on the Bersimis Project high-powered jets of water are played on the fill as it is dumped.

Cat-walks of the type shown above are extended out far enough for the operator at the end to direct a monitor nozzle over a wide area.

3. One of the 7 drill jumbos used for driving the tunnel, pulled back from the face with its centre deck folded up to allow mucking trucks to pass through.

Each jumbo carried 20-22 DA-35 Drifters mounted on model C-789 hydraulic jumbo booms.

has been operating a 400-ton mill for the past year with an operating profit amounting to $1,300,000. Plans call for raising the capacity to 450-500 tons per day. At present it is averaging about 420 tons per day of ore grading close to 6% copper per ton.

Until a 150-mile, 154,000-volt Hydro-Quebec transmission line, now being built from Dolbeau at the Head of Lac St. Jean, reaches the Chibougamau area, Opemiska Copper, like all other properties in the area, is forced to operate on expensive power generated by diesel engines. The new line, carrying Bersimis power, should be complete this summer, and this introduction of less expensive, steadier hydro-electric power will do much toward establishing Chibougamau as a permanent unit on Quebec's mining map.

Along this line, Campbell-Chibougamau Mines Limited on Merrill Island in Dore Lake, which expects to come into production this spring, has built a large concentrator with an initial milling rate of 1,750 tons per day—underground work thus far has stockpiled 100,000 tons ready for treatment. Reserves amount to some 1,900,000 tons grading 2.98% copper and .085 ozs. of gold per ton.

Chibougamau Explorers Limited are building a 500-ton mill which will use Bersimis power, and are already considering expansion to 750 tons. From the 500-ton mill a yearly gross of $2,658,000 is expected at $14.65 per ton. Reserves are estimated as 561,369 tons of ore, averaging .29 oz. of gold and 0.73% copper per ton.

Another project consists of a nickel-copper smelter and refinery which will use Bersimis power to the advantage of the properties mentioned above and eventually for some of the 100-odd smaller companies that now hold claims in the Chibougamau area.

Power To Gaspe

There is no doubt that the Noranda Mining Company's plans for their subsidiary, Gaspe Copper Mines Limited, would be on a much smaller scale except for the availability of power from the Bersimis. Engrossing 67,000,000 tons of 1.45% to 1.76% copper ore ($400,000,000) this mine in Quebec's Gaspe Peninsula will be served by a 31-mile transmission line extending from Chute Aux Outardes on the North Shore of the St. Lawrence River to Les Boules, near Matane, on the South Shore.

Putting Gaspe Copper in production will cost $35,000,000 and a construction force of over 1,700 men. Plans call for the milling of 6,500 tons per day of ore and the smelting of 400-500 tons of copper concentrates per day—all to get going this year.

Asbestos Mining Area Grows

A glance at a map of the Electric Transmission system of the Shawinigan Water and Power Company shows how the Asbestos Mining area around Thetford, Quebec, is served by a 60,000-volt two-circuit steel-towered transmission line from Quebec City. Power flowing over this line comes from a generating station at Chaudiere tied in with another at Ile Maligne near Lake St. John.

A large block of Bersimis power—400,000 h.p.—has been purchased by the Shawinigan Company to serve this system. Thus, indirectly, but no less effectively, power from the Bersimis is serving still another important mining area in Quebec.

Close to a million tons of fibre are shipped from this area annually—last year valued at $87,000,000. Of this, 97 per cent was shipped to the United States, thus contributing to the Canadian dollar's edge on the exchange rate.

The Canadian Johns-Manville Company Ltd. is the leading producer of 11 mines, which last year accounted for roughly one-third of Quebec's entire mineral output. The Johns-Manville Company's Jeffrey Property is the largest asbestos mine in the world. And, last year saw the opening of the largest asbestos mill in the world, the new Johns-Manville plant with a yearly capacity of 635,000 tons of fire-proof fibre.

Other expansions in the asbestos area include the $25,000 job of draining Black Lake to place United Asbestos Corporation in open pit production from ore reserves estimated at 50 million tons. This project will require the removal of 30 million cu. yds. of clay, sand and gravel that lies on the bottom of the lake—plus the diversion of incoming streams, and the relocation of a main highway.

Other mines in the area are busy converting from open pit to underground operations, always with increased production as a goal. Three major asbestos producers in the Thetford Mines region are spending $5,000,000 in a cooperative effort to extend their mining areas by moving a whole section of the town. The three mines involved are the Bell mine, the King mine of the Asbestos Corporation, and the Johnson's mine.

In all, the asbestos industry in Quebec has now underway $70,000,000 worth of new construction and improvement which the Bersimis power project

(Continued on page 24)

THE PICTURES

(On the Left)

1. Ready for concrete, these large wooden forms will be used to shape the entrance to the 8-mile long power tunnel.

A hydraulically critical factor in power tunnels is the necessity to lead the water smoothly into the bore with a minimum of turbulence. The latter causes entrained air which forms flow-disturbing pockets and the resulting destructive water hammer.

Then there is also the need for control gates and traps—all elements requiring concrete foundations and abutments.

2. This tunnel adit on the Cartier Construction Company's section of the job is 55 feet high and 40 feet wide and slopes down 7.21% for a distance of 2,660 ft., where it meets the tunnel line. A third of the way in, it passes under a lake.

3. A small part of Labrieville showing some of the houses built for construction workers who wanted to bring their families on the job. The town eventually grew to 5,000 people and has complete facilities, including Protestant and Roman Catholic schools and churches, a fully equipped hospital and recreation centre.

4. An early stage in the power access tunnel. A line of jackhammers does some trimming while a 4-yd. shovel loads muck from a previous blast along the approach.

(On the Right)

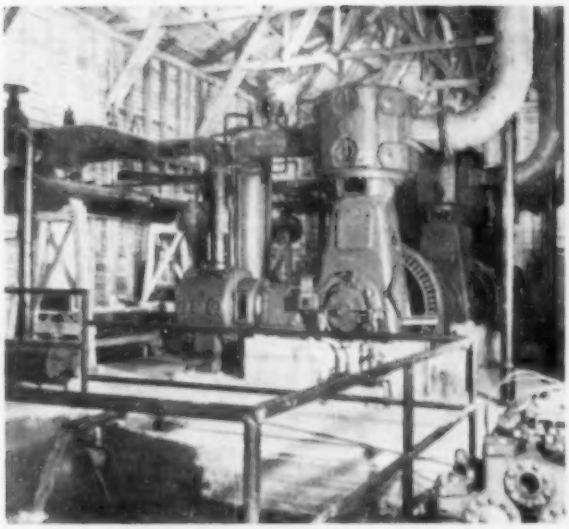
1. What appears in this picture as a big chunk of granite will in a few months be the hydraulically accurate intake for the 8-mile 35-ft. bore Bersimis Power tunnel.

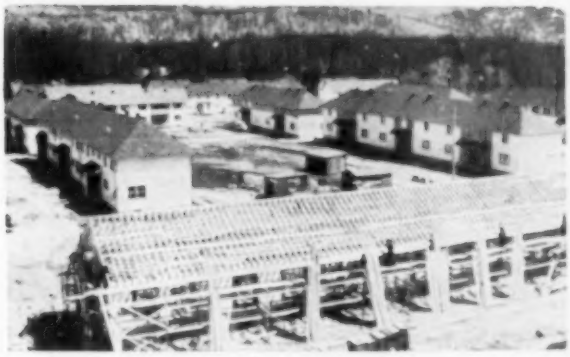
The line of jackhammer operators is levelling the tunnel entrances sufficiently to allow a 22 drill jumbo to start punching blast holes.

2. During early stages of the job air power was supplied by 16 IKA-315 Portable Compressors. When the temporary powerhouse came on line stationary XVH type compressors were installed close to each tunnel adit and near the dam site—10 in all.

Pictured is the powerhouse at the Perini Construction Company's end of the job near the main powerhouse site.

3. The top deck of a small jumbo used to drive an adit. Da-35 power feed drifters are mounted on C-789 hydraulic jumbo booms.





Mineral Prospects of the Knee Lake Map Area, Manitoba*

By H. A. QUINN, Geologist, Geological Survey of Canada

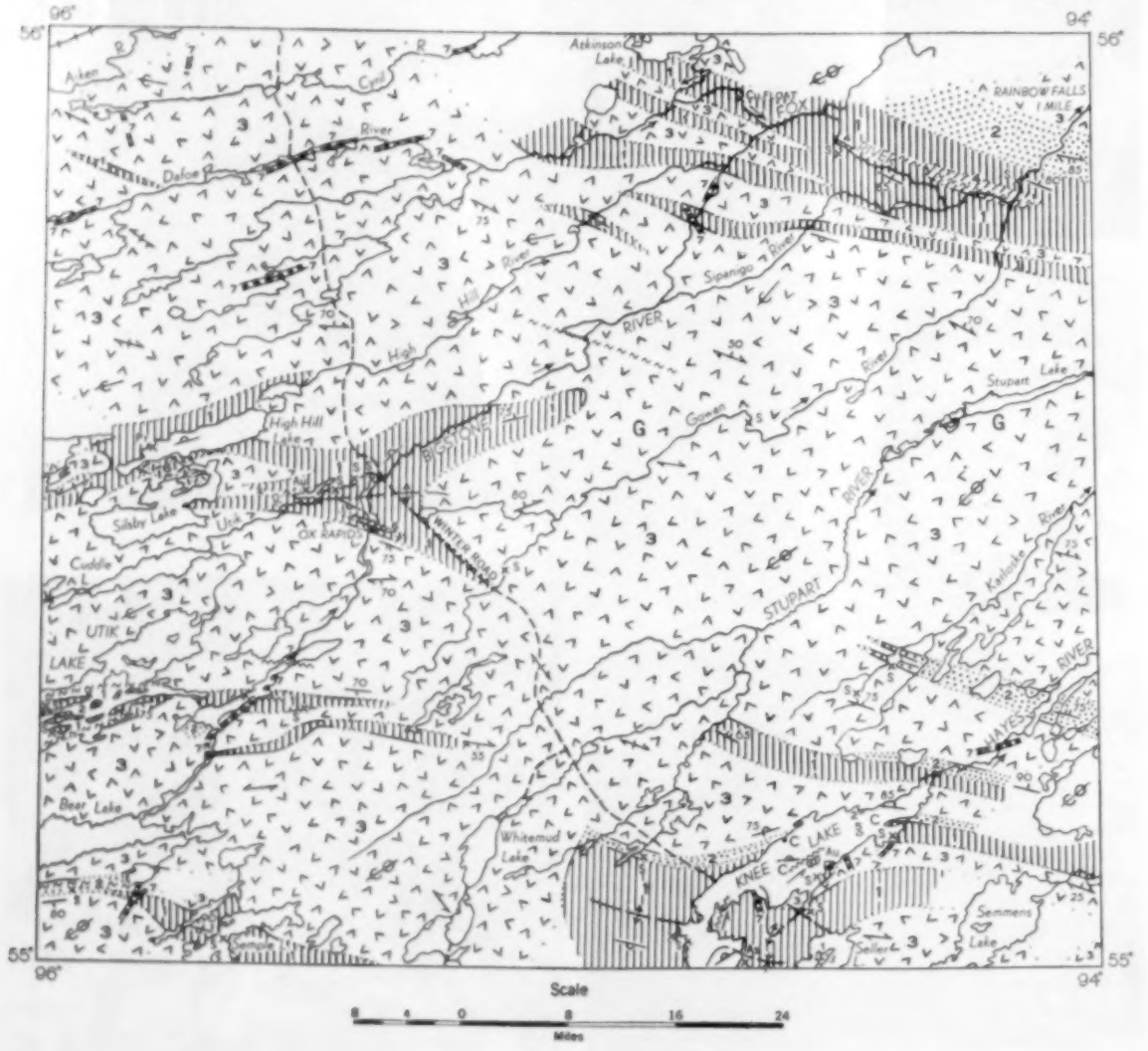
THE KNEE Lake map-area, extending from 55 to 56 degrees north latitude and from 94 to 96 degrees west longitude, contains 5,433 square miles. It is most conveniently reached by aircraft based at Norway House, Wabowden, Ilford, Churchill, and The Pas. Parts are accessible by canoe from Norway House via Nelson, Echimamish, and Hayes Rivers and from York Factory via Hayes, Fox, Bigstone, Dafoe, Utik, Sipanigo, Gowan, and Stupart Rivers. A winter road runs southerly through the area from Ilford on the Hudson Bay line of Canadian National Railways.

York boats carried many passengers and much freight from York Factory to Winnipeg via Hayes River and Knee Lake in the 19th century. Geological investigation of the area began in 1878 when Robert Bell (1) of the Geological Survey of Canada made a survey of this famous boat route from Lake Winnipeg to Hudson Bay. Dr. Bell passed through Knee Lake again in 1880 en route to England. Brock (2) and Tyrrell (18) made cursory examinations while descending Hayes River in 1910 and 1912 respectively. In 1911 McInnes (8) compiled all geological information available for an area of 220,000 square miles, including the Knee Lake district.

Discovery of gold in the southern part of Knee Lake in 1918 led to more detailed study of the region. In 1919 Bruce (3) examined these gold showings and mapped the geology of the

* Published by permission of the Acting Deputy Minister, Department of Mines and Technical Surveys, Ottawa.

(1) For references see end of paper.



LEGEND

7 — Diabase and gabbro.

6 — Pegmatite, minor aplite.

5o — Quartz porphyry and quartz-feldspar porphyry; rhyolite.

4 — Serpentinite, pyroxenite, peridotite, and serpentinized dunite.

3 — Granite, granite-gneiss and inclusions of 1 and 2.

2 — Greywacke, quartzite, arkose, slate and conglomerate; phyllite; nodular cordierite schist; garnetiferous plagioclase-biotite-quartz gneiss and schist; staurolite-garnet-mica-quartz schist; minor volcanic rocks and hybrid gneiss.

1 — Basalt, andesite, and tuff; greenstone; minor rhyolite, agglomerate, chert, and iron formation; minor diorite, diabase, and gabbro; minor sedimentary rocks; hornblende-plagioclase gneiss; amphibolite.

SYMBOLS

Geological boundary (observed, assumed)

Bedding (inclined, vertical, overturned, dip unknown)

Bedding (direction of dip unknown, upper side of bed unknown)

Gneissosity (inclined, vertical, dip unknown)

Fault (defined, assumed)

Anticline (position approximate)

Syncline (position approximate)

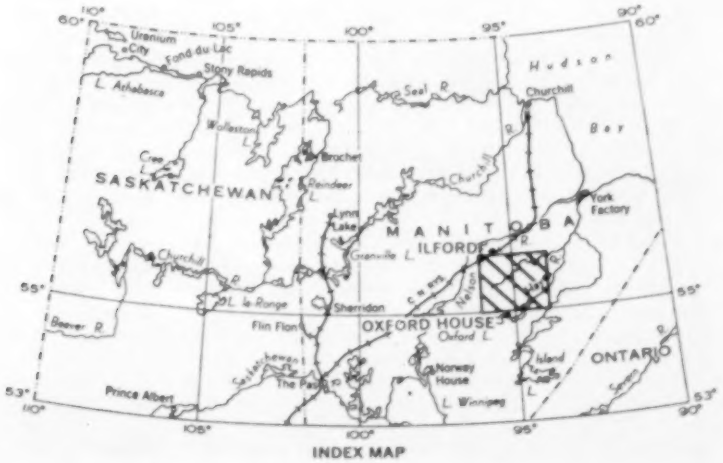
Glacial striae

Drift ridges

Mineral occurrences (As, arsenopyrite; Au, gold; Cu, chalcopyrite; Pr, pyrrhotite; S, sulphides) — x

High gravity anomaly — G

Carbonatized rocks — C



INDEX MAP

Headframe at south shaft of Amalgamated Knee Lake Mines Ltd. Osprey nest on top of headframe.

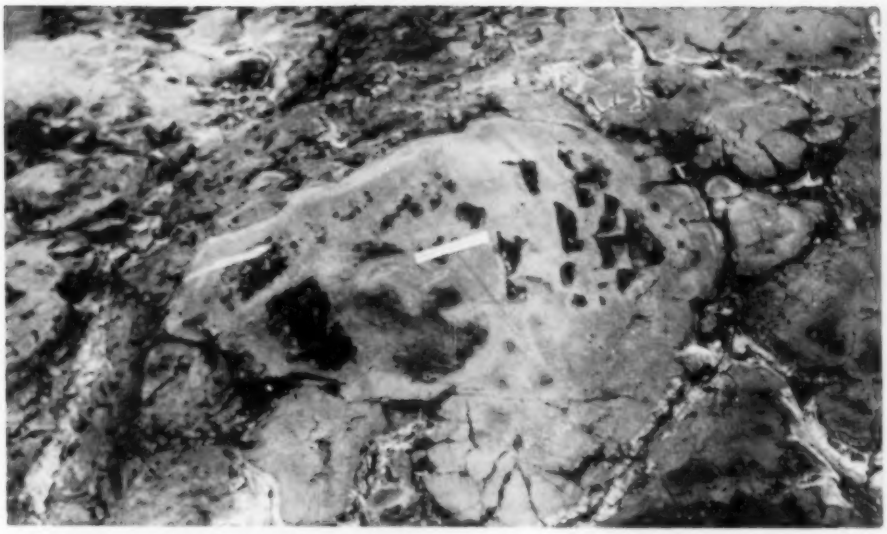
Pillows in basic volcanic rocks in northeastern part of Knee Lake. Top of pillows are at right.

shores of Knee, Peemow, and Whitemud Lakes. Merritt (9) traversed parts of Bigstone, Fox, and Sipanigo Rivers in 1925. Discoveries of gold, short distances south of the area at Island Lake in 1928 and 1931 and at Gods Lake in 1932 spurred further exploration. Prospectors Robert Brown, R. G. O. Johnston, and Russell McIntosh found gold in 1934 in the northeastern part of Knee Lake on the property now held by Amalgamated Knee Lake Mines Limited.

In 1946 Springer (17) did some geological mapping in the vicinity of Knee, Parker, and Stupart Lakes. Prospectors J. Loveless and F. Conley staked the Ore group of mining claims for gold (?) in 1950 at a small lake on Utik River about 5½ miles northwest of Ox Rapids, but they did not record these claims. In 1952 and 1953 Milligan and Take (12) mapped the geology of 230 square miles in the southwest corner of the map-area. Moorhouse and Shepherd (13) in 1953 mapped a similar area adjoining on the east that done by Milligan and Take. Copper and gold, discovered at Utik Lake in 1951, led to staking of the Utik group of claims of Kay Lake Mines Ltd. in 1951 and 1952 and the Dog group of Wright-Hargreaves Mines Limited in 1953. The writer (16) and 7 assistants made a geological reconnaissance of the Knee Lake map-area in 1954.

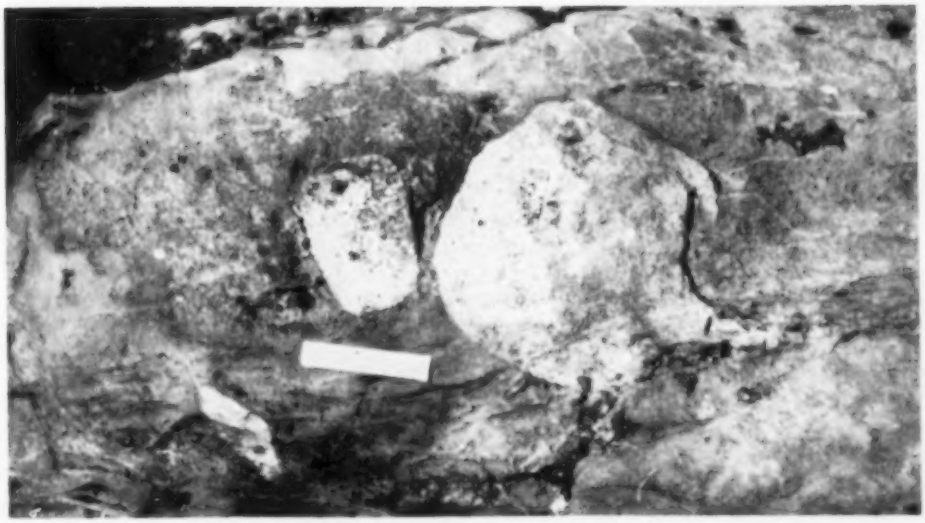
SURFACE FEATURES AND GLACIATION

More than 95 per cent of the surface of the map-area is covered by glacial drift, swamp and muskeg. The surface is about 700 feet above sea-level in the southwestern part of the area and it slopes gently northeastward so that Fox River at the northeastern edge of the area is a little less than 400 feet above sea-level. Knee Lake and a small lake in the northwest corner of the area are 569 and 630 feet above sea-level respectively. Relief is very low, seldom exceeding 100 feet. Outcrops are generally low and almost all are confined to shores of larger lakes and rivers. The drift is thin in the northwestern part, but in the eastern part, particularly on the lower reaches of the Fox River, surface deposits are 80 feet or more thick. Almost all drift consists of unsorted clay, sand, and boulders (till). The surface of some large areas of the drift displays long, low ridges trending northeast and these are oriented parallel to the direction of advance of the last ice-sheet. Abundant striae on bedrock confirm that the direction of movement of this ice-sheet varied from southwest in the eastern part to west in the northwestern part of the map-area. A few striae beneath 80 feet of drift in the northeast corner trend southeasterly. A few, small, stratified deposits of sand and clay noted in the southern part probably were deposited in local, shallow glacial lakes. Although no evidence of post-Glacial marine overlap was recognized within the area itself, prominent spits and beaches were observed on air photographs of the country a few miles north of the northeastern part of the map-area. Because of this and because of the 12 feet of stratified marine sands and clays (Hayes River Series) reported by Tyrrell (18) to overlie the glacial drift at the mouth of the Fox River, 26 miles east of the northeast corner, it seems probable that the post-Glacial sea extended approximately to the northeast corner of the area and partially or completely filled

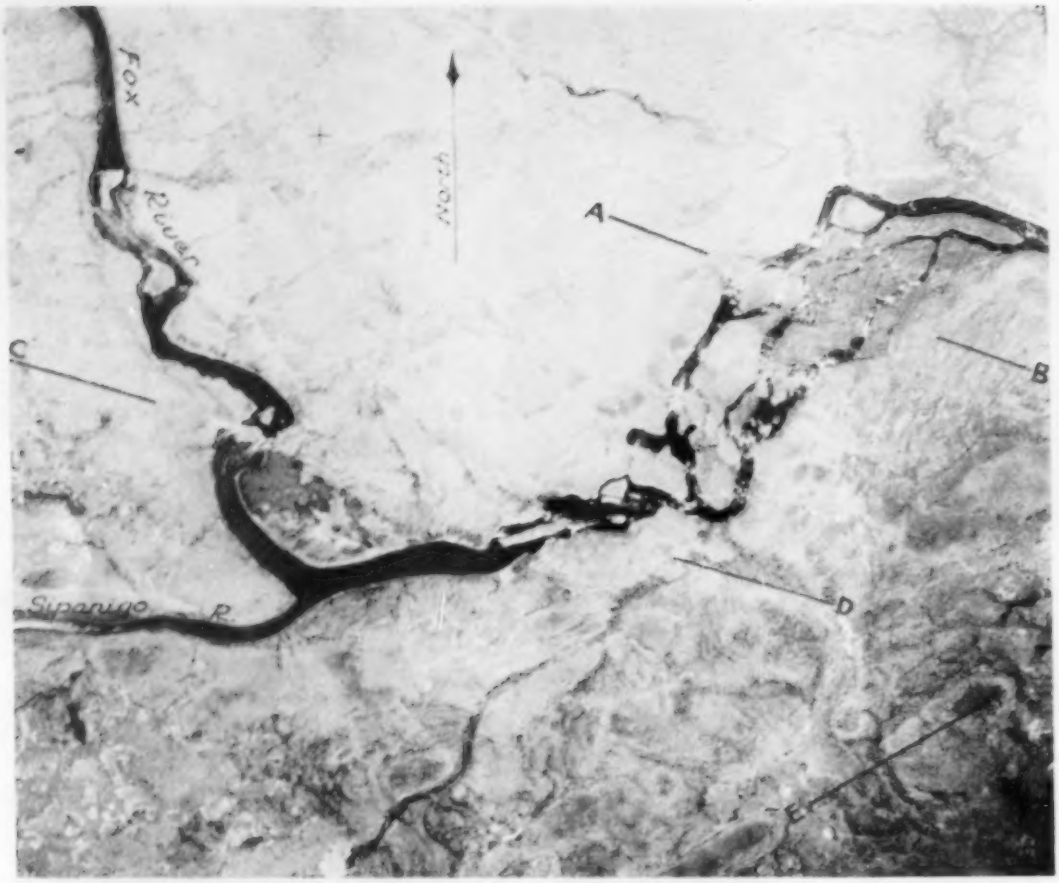


Layers of flat vesicles in upper part of pillow of basic lava at junction of Fox and Sipanigo Rivers. Top of pillow is toward right of picture. Scale is 7 inches long.

Conglomerate near northeastern end of Knee Lake. Most of the larger, light-colored fragments are granite.



Rounded masses of quartz prophry (light) intruding basic volcanic rocks on property of Amalgamated Knee Lake Mines Ltd. Scale is 7 inches long.



Vertical air photograph of area at junction of Fox and Sipanigo Rivers. Southern contact of utrabasic sill at A-B. Band of pillowed greenstone with prominent vesicles and amygdales at C-D. Line E-F shows orientation. Of drift ridge at south edge of photo. Waters of Fox River fall more than 100 feet here. Width of area shown is 17,000 feet. Courtesy R.C.A.F.

the valley of the Fox River there. Thus, in general, the map-area lies between the basin of glacial Lake Agassiz which Upham (19) indicated as extending almost to its southwest corner and the post-Glacial sea which extended to its northeast corner.

GENERAL GEOLOGY

Summary Statement of Formations

Precambrian

Basic intrusions: diabase, gabbro

(Intrusive contact).

Granitic intrusions: pegmatite, aplite, quartz and quartz-feldspar porphyry, rhyolite, granite, granodiorite, quartz monzonite, syenite.

(Intrusive contact)

Ultrabasic intrusions: serpentinite, pyroxenite, peridotite, serpentinized dunite.

(Intrusive contact)

Granitic intrusions: granite - gneiss with inclusions of older rocks.

(Intrusive contact)

Oxford group: greywacke, quartzite, arkose, slate, conglomerate, phyllite, nodular cordierite schist, garnetiferous plagioclase-biotite-quartz gneiss and schist; staurolite - garnet - mica - quartz schist.

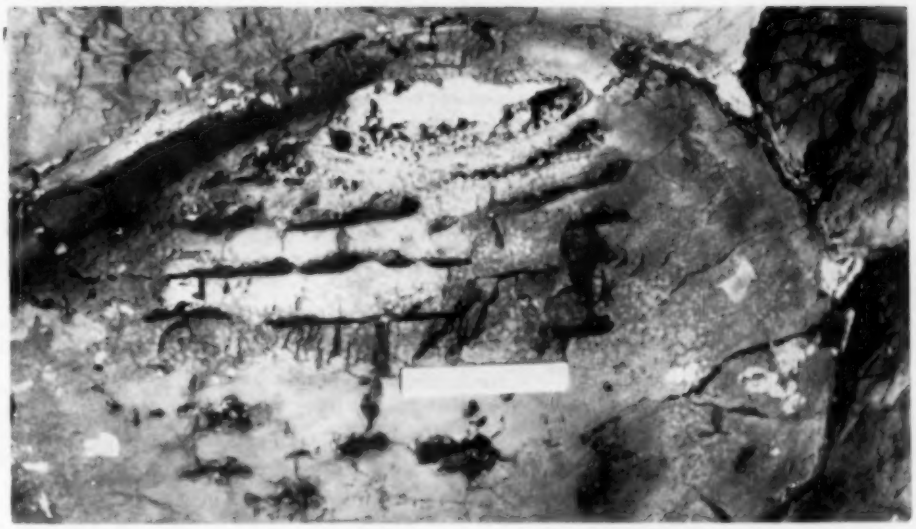
(Unconformity)

Hayes River group: basalt, andesite, dacite, trachyte, rhyolite, tuff, agglomerate, iron formation, chert, mica schist, chlorite schist, sericite schist, hornblende-plagioclase gneiss, amphibolite, minor diorite, diabase, and gabbro.

The accompanying map with its simplified legend shows the distribution of the main rock types. Although granitic rocks (3) predominate, several belts of volcanic (1) and sedimentary rocks (2) occur, mainly in the southern and northeastern parts of the area.

The oldest rocks (1), named the Hayes river group by Wright (21) in the Oxford House area on the south, consist mainly of basic to intermediate volcanic rocks and their metamorphosed equivalents, but they also include lesser amounts of interbedded chert, iron formation, acidic volcanic rocks, and basic sills. These rocks are similar to those known as Keewatin in Ontario and to those known as Amisk in Saskatchewan and western Manitoba. Many of the flows are characterized by long, thin, pillows from 3 inches thick by 18 inches long up to 5 feet thick by 20 feet long. Some of the pillows in their upper part display abundant amygdules and layers of long thin amygdales (large, filled vesicles) many of which contain quartz, calcite, and other minerals. Bands of flow breccia, agglomerate, and tuff occur at a few places. In the northeastern part of Knee Lake the volcanic rocks locally contain much brown-weathering carbonate in alternating zones up to 3 feet wide trending parallel with the country rock. The acid volcanic rocks, including rhyolite, trachyte, and dacite, are most common in the band of volcanic rocks passing through Semple Lake. Bands of thinly-bedded, contorted, grey chert and siliceous iron formation up to 20 feet or more wide are fairly common within the belts of volcanic rocks. At many points these contain disseminated sulphides and considerable magnetite, causing many strong, local, magnetic anomalies.

Looking northeast down valley of Fox River, about 7 miles below mouth of Govan River. Sides of valley rise about 80 feet above river and are composed of uncorted glacial drift (till).



Layers of flat vesicles and amygdales in upper part of pillow of basic lava at junction of Fox and Sipanigo Rivers. Note numerous small round amygdales or variolites near vesicles. Top of pillow is toward top of photograph. Scale is 7 inches long.

The sedimentary rocks and their metamorphosed equivalents (2) have been named the Oxford group by Wright (21) to the south. They overlie the rocks of the Hayes River group and, although they trend parallel with them at most places, there is thought to be an unconformity between them. A band of conglomerate at least 2,000 feet thick overlies the volcanic rocks in the northeastern part of Knee Lake. The basal beds of this conglomerate consist mainly of sub-angular to round, dark grey pebbles up to 6 inches long of basic volcanic rock in a matrix of fine-grained, dark greenish grey chloritic material. As noted by Bell (1, p. 22), most of the conglomerate, however, displays prominent, light grey, well-rounded pebbles and boulders up to 2 feet in diameter of granite and syenite, set in a fine-grained grey matrix of quartz-mica schist.

At Utik Lake the sedimentary rocks consist mainly of grey, fine-grained plagioclase-biotite-quartz gneiss containing a few small metacrysts of red garnet and of coarser-grained plagioclase-biotite-quartz schist containing abundant metacrysts of cordierite and garnet up to $\frac{5}{8}$ inch long. At Bigstone Lake and a few other places the sedimentary rocks include some lit-par-lit and hybrid gneisses.

The granitic rocks (3) shown on the accompanying map include both granite-gneiss and younger, massive granite, granodiorite, quartz monzonite, and syenite. Existence of a third, and still older, granite may be indicated by the granitic boulders in the conglomerate. The granite-gneiss is extremely variable in composition, color, and grain size and in places contains remnants of the older rocks. The occurrence at several points of bands of sedimentary rocks (2) between the volcanic rocks (1) and the granite-gneiss (3) suggests that much of the latter rock may have been formed by granitization of 2. Granodiorite is the most common of the younger granitic rocks. It is commonly massive to faintly foliated, medium-grained, and buff, grey, or pinkish grey.

The ultrabasic rocks (4), including serpentinite, pyroxenite, peridotite, and serpentinized dunite, were found only within the Fox River band of volcanic rocks (1). A layered body of these rocks at least 2,500 feet thick outcrops along Fox River about $3\frac{1}{2}$ miles west of the mouth of Gowan River. This body is poorly exposed, but as the layers trend

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slightly south of east parallel to the strike of the enclosing volcanic rocks it is probably a sill rather than a pipe. According to Dawson (4) similar ultrabasic rocks in the Partridge Crop Lake area some 75 miles to the west are younger than the granite-gneiss but older than the late massive granites. Although most of the Fox River sill consists of serpentinite and of serpentinized pyroxenite and peridotite, some bands 25 feet or more thick are composed of unaltered peridotite and pyroxenite. One band of serpentinite at least 20 feet thick near the base (south side) of the sill probably was derived from dunite. Veinlets and disseminated grains of magnetite occur throughout the sill. A few grains of sulphides and a few microscopic veinlets of cross-fibre serpentine were noted at one point.

Several islands in the northeastern part of Knee Lake are underlain by light grey, massive to schistose, fine- to medium-grained quartz porphyry and quartz-feldspar porphyry (5). Rounded phenocrysts of bluish to milky opalescent quartz up to 1/4 inch across are prominent on the white-weathered surface. Dykes and sills up to 25 feet wide of this rock and those of very fine-grained, white-weathering rhyolite are numerous in the volcanic rocks (1) in this vicinity. The porphyries may correspond to the "quartz-eye" granite found in other parts of northern Manitoba.

Dykes and sills of granitic pegmatite, and alaskite are common in some parts of the area. These rocks are normally massive, pink to light grey and locally very coarse-grained. They consist mainly of feldspar, in crystals up to 1 foot long, with smaller amounts of quartz occurring both between the crystals of feldspar and in graphic intergrowth within them. Muscovite is a minor constituent, locally found in books up to 6 inches long. Intergrowths of muscovite and white feldspar up to 6 inches long were noted in the pegmatite near Ox Rapids. Merritt (9) reports biotite-bearing pegmatite dykes as much as 500 feet wide at Bigstone Lake.

Late basic dykes (7), consisting mainly of diabase and gabbro, are unusually abundant in parts of the map-area. Although most of them are less than 50 feet wide and have various trends, the larger and more persistent ones are as much as 500 feet wide and strike northeasterly. They consist of massive, dark grey, fine-to medium-grained rock composed mainly of labradorite and greenish brown pyroxene, with smaller amounts of hornblende, epidote, quartz, chlorite, apatite, magnetite and traces of sulphides. Some of the coarser-grained varieties show much alteration of labradorite to epidote and of pyroxene to hornblende and chlorite.

All rocks older than the late, massive granites have been isoclinally folded. Most of these folds trend uniformly slightly south of east and the beds on their limbs dip vertically or nearly so. At Knee Lake the volcanic and sedimentary strata have a combined total thickness estimated to be at least 20,000 feet. Small drag-folds are present in the iron formation at many places and larger drag-folds occur in the volcanic rocks at Knee Lake.

Little is known about faulting. At Bigstone Lake two easterly-trending, right-hand faults cause horizontal displacements of 200 and 2,000 feet respectively in a 200-foot wide diabase dyke. At Knee Lake two small left-hand faults trending northeasterly were noted in the volcanic rocks as well as a few zones of northeasterly trending schisting in the largest body of porphyry found there. Milligan and Take (12) have traced the Utik Lake and Bear Lake strike faults into the map-area from the west. They conclude that the north sides of both faults moved eastward and upward and they estimate that the horizontal displacements may be about 2,000 and 25,000 feet respectively. It is assumed that the large ultrabasic sill on the Fox River was emplaced along a southeasterly trending zone of faulting.

MINERAL OCCURRENCES

All of the several belts of volcanic and sedimentary rocks contain small to moderate amounts of sulphides locally and therefore are of economic interest as potential sources of base and precious metals. The bodies of ultrabasic rocks are also of interest as possible sources of base metals, platinum, chromite, asbestos or even diamonds. Metallic minerals found within the map-area to date include gold, silver, galena, sphalerite, chalcopyrite, pyrrhotite, pyrite, arsenopyrite, and magnetite. These minerals are most abundant in the belts of intermediate to basic volcanic rocks.

Very little prospecting has been done in the area. Most of the belts of favorable rocks are largely obscured by overburden except on the shores of some of the lakes and streams. Thus prospecting by ordinary or old fashioned ground methods is difficult or ineffective in most parts of the area. Under these circumstances better results might be obtained by preliminary use of various types of geophysical, geochemical, and geobotanical methods.

Knee Lake Belt

This belt of volcanic and sedimentary rocks has a maximum width of 20 miles at Knee Lake and south of the map-area it has been traced from near

Walker Lake on the west to the east end of Gods Lake on the east, a distance of about 140 miles (5). The volcanic rocks at Knee Lake have been drag-folded, sheared, carbonatized, silicified, intruded by quartz porphyry, and locally contain appreciable amounts of pyrite, pyrrhotite, chalcopyrite, galena, sphalerite, arsenopyrite, gold and silver. In the northwest part the belt is intruded and cut off by a body of late, massive granite.

In the summer of 1934 gold was discovered by prospectors Robert Brown, R. G. O. Johnston, and Russell McIntosh on the eastern shore of Knee Lake about 8 miles north of the south boundary of the map-area. Two adjoining groups of mining claims were staked, the north group being acquired by Knee Lake Gold Mines Limited and the south group by Johnston Knee Lake Gold Mines Limited. In 1935, following several thousand feet of surface diamond drilling, vertical shafts, 1,140 feet apart were sunk on each property to 350 feet depth and several hundred feet of drifting and crosscutting were completed on levels 174 and 325 feet deep. R. C. Brehaut and Frank Smith supervised this work on the properties of Johnston Knee Lake Mines Limited and Knee Lake Gold Mines Limited respectively. All work was discontinued on both properties in the autumn of 1935 and all but twenty-six of the claims were allowed to lapse. In 1947 the two properties were united under a new company, Amalgamated Knee Lake Mines Limited.

Waterfall at ultrabasic sill on Fox River. Water falls over a band of remarkably fresh peridotite (right) to lower ground (left) underlain by softer and much fractured serpentinite (altered dunite).

The mineralized zone, explored by the two shafts and diamond drilling for a length of 2,000 feet, strikes northeasterly and dips vertically to 80 degrees southeast and is conformable with the greenstones in which it occurs. Within this zone are scattered bodies of quartz porphyry varying from ball-like masses less than a foot in diameter to dykes and sills as much as 20 feet wide. Although most of these bodies are irregular and discontinuous, one sill or dyke striking mainly northeast and dipping 85 degrees southeast is continuous for

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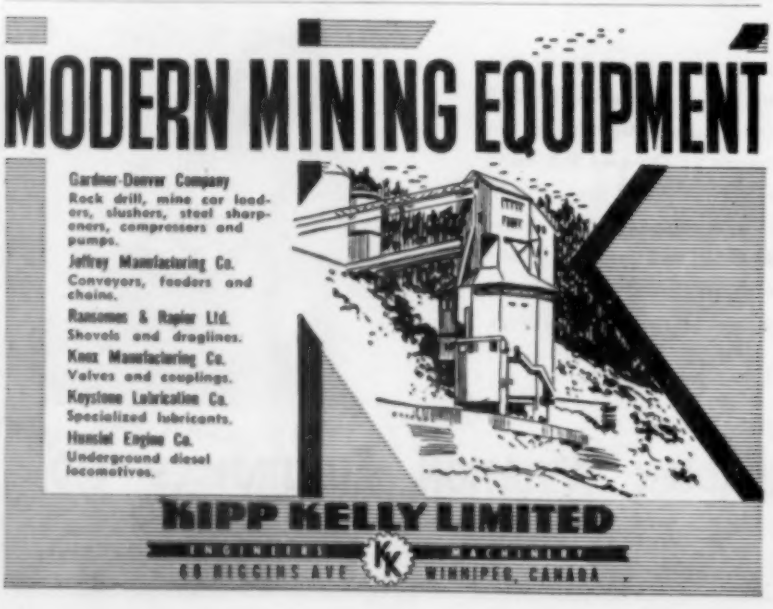
several hundred feet with an average width of 10 to 15 feet. In some places the contacts of the porphyry and greenstones have been sheared and mineralized with disseminated pyrite, pyrrhotite, and chalcopyrite. Discontinuous stringers and veinlets of white to grey quartz normally each less than 4 inches wide are found along and near the walls of the sill. Gold, associated with sphalerite, lesser amounts of galena and the other sulphides, is visible in many of these veinlets. Company officials report that a number of high grade sections were encountered during the underground program.

About 1¼ miles southwest of the shafts an oxidized, schistose zone 20 feet wide occurs in massive greenstone on a point on the east shore of the lake. The zone strikes easterly, dips vertically and contains 2 to 4 per cent of fine-grained disseminated pyrrhotite and lesser amounts of pyrite. One band about 3 feet wide in the northern part of the zone is highly silicified.

Five miles northeast of the shafts in a large bay on the east shore of Knee Lake several parallel veins of white quartz from 6 inches to 6 feet wide occur over a width of 20 feet. They lie in schistose conglomerate along and parallel to its contact with gneissic greenstone containing two sills of quartz porphyry five and eight feet wide respectively. All the veins strike at 75 degrees and dip 75 degrees north. Small amounts of disseminated pyrite, pyrrhotite, and chalcopyrite are found in the schistose conglomerate adjacent to the veins. Traces of these sulphides occur also in the quartz veins, and especially in thin folia of schist included in the quartz. A trench 15 feet long, 5 feet wide, and 4 feet deep has been put down along some of the veins.

Another mineralized zone occurs along the south shore of a small lake or bay just off the east shore of Knee Lake at the south boundary of the map-area. This zone lies in chlorite schist and consists of a band of grey to black, thinly banded chert or siliceous slate 4 to 5 feet wide and traced for a length of 1,200 feet. The band trends at 95 degrees and dips vertically. It contains several per cent of disseminated arsenopyrite and smaller amounts of pyrite and chalcopyrite. A vein of white quartz about 4 feet wide occurs in the chlorite schist near the mineralized band and parallel to it.

Several other zones of shearing with varying amounts of silicification, carbonatization, and sulphide mineralization are found in the volcanic rocks on the shores of Knee Lake. One of these is exposed on the west end of an island about three miles west of the shafts. Here a zone at least 300 feet wide strikes east and dips vertically, parallel to the schistose, pillowed greenstones in which it lies. Within this zone are numerous conformable bands or lenses up to 3 feet wide by 50 feet or more long of brown-weathering, carbonatized volcanic rock and parallel zones up to 3 feet wide by at least 100 feet long containing many lenticular bodies of white quartz and some veins of quartz up to 2½ feet wide. In the northern part of the zone bands up to 15 feet or more wide of chlorite and sericite schist are separated by bands varying from pillowed greenstone to massive, porphyritic and non-porphyritic, fine- and medium-grained andesite. Massive granite is exposed on an islet about 4,000 ft. south of the zone.



Fox River Belt

This belt of volcanic and sedimentary rocks is covered by thick overburden except at a very few places along streams. The belt trends a little south of east, dips nearly vertically, and is at least 10 mile wide and 30 miles long. The southern 2/3, which appears to be the stratigraphically lowest part of the belt, consists mainly of basic to intermediate volcanic rocks comprising flows interbedded with flow breccia, agglomerate and tuff. Some of the flows are massive and others display spectacular pillow structures, vesicles, amygdales, and amygdules or variolites. The agglomerate occurs in bands at least 20 feet wide and contains closely-packed, rounded, bomb-like masses a foot or less in diameter. Here and there within this volcanic assemblage occur bands at least 100 feet thick of thinly-banded, fine-grained, light grey cherty sediments. These, locally at least, contain gash veinlets of white quartz and calcite and small amounts of very fine-grained sulphides (mainly pyrrhotite). Two sills, at least 30 feet and 2,500 feet wide respectively, of ultrabasic rocks were observed within the volcanic assemblage. A few thin bands of rhyolite and other acidic volcanic rocks also occur. The volcanic rocks are overlain by nodular and non-nodular meta-sedimentary gneisses and schists which comprise the northern third of the belt. These consist mainly of strongly banded, grey staurolite-garnet-mica-quartz schist and garnetiferous plagioclase-biotite-quartz gneiss and schist.

Large angular boulders in Fox River about 3 miles above the mouth of Bigstone River contain 1 to 3 per cent of disseminated pyrite, pyrrhotite, and chalcopyrite in massive greenstone, rhyolite, and agglomerate or breccia marked by a spotted type of alteration. Bedrock source of these boulders is probably but a short distance northeast of their present location but no outcrops are known in this direction for several miles.

About 1936 an Indian trapper is reported to have found galena on a small island in Fox River about ½ mile below Rainbow Falls.[1] These samples were said to assay 18 ounces silver and $3.00 in gold per ton. The galena is reported to occur in quartz veinlets cutting coarse-grained, friable, flat dipping, sedimentary rocks.

On Fox River from 1½ to 2½ miles below the mouth of Gowan River the volcanic rocks locally contain up to 2 per cent of fine-grained disseminated sulphides, mainly pyrrhotite, with lesser amounts of pyrite and chalcopyrite.

[1] Personal communication from Oliver Lindal, Ilford, Manitoba.

Although a cursory and hurried examination of the previously described ultrabasic sill outcropping along Fox River about 3½ miles west of the mouth of Gowan River disclosed no appreciable amounts of valuable minerals, this body deserves closer inspection. It is a possible source of base metals, including nickel, and of platinum, chromite, asbestos, or, if it should turn out to be a pipe or plug, even of diamonds. Examination of this body on the ground is possible at only a few points along the Fox River, as the waters of this stream drop more than 100 feet in a continuous series of rapids and waterfalls in descending from the volcanic rocks to the ultrabasic rock. The northernmost exposure of the sill is along the north bank of the Fox River below the waterfalls. The drift cover here is about 80 feet thick. Because of the magnetite in it, the shape and extent of this body of ultrabasic rocks probably could be determined most conveniently by aeromagnetic survey.

Bigstone River-High Hill Lake Belt

This belt of volcanic rocks is very poorly exposed except along Bigstone and Utik Rivers and because of this its boundaries are unknown at most places. The belt is known to extend continuously northeastward from Utik River for 25 miles to a point east of Bigstone River and has a minimum average width of 5 miles. It may extend continuously for 40 miles or more to or near the western boundary of the map-area, as shown on the accompanying map. Although the belt consists mainly of greenstones, hornblende-plagioclase gneiss, and amphibolite, it includes some bands of greywacke and several bands of cherty sediments and iron formation. Most of the sulphide mineralization noted in the belt is in or near the bands of iron formation and cherty sediments.

In 1950 the unrecorded Ore group of mining claims was staked by J. Loveless and F. Conley to cover a showing on an island in a small lake on the Utik River about 5½ miles northwest of Ox Rapids. Several pits and trenches up to 6 feet wide by 8 feet long by 5 feet deep have been blasted out on this island which is only 100 feet wide and extends for about 600 feet northeasterly. The island is underlain by iron formation, chlorite schist, and massive to fragmental greenstone all of which trend at 75 degrees and dip northward at 80 degrees. The iron formation consists of black beds up to ¼ inch wide rich in magnetite separated by beds of fine-grained white silica from ⅛ to ½ inch wide and by a few thin beds of fine-grained greenish material. The chlorite schist adjacent to the iron formation contains 5 to 10 per cent of fine-grained, disseminated pyrite and smaller amounts of pyrite occur also in the iron formation itself. Veins and stockworks up to 5 feet wide of white, grey, and bluish grey quartz occur in all rock types on the island.

On the south bank of the Utik River about 2 miles east of the island described in the preceding paragraph is an oxidized, schistose zone trending southeasterly and dipping 60 degrees southwest. The zone is in greenstone and is about 4 feet wide and 50 feet or more long. Some of the quartz and silicified material in the zone contains several per cent of fine-grained disseminated pyrite.

About 2 miles farther down the Utik River and on its west bank is a northeasterly trending, contorted band at least 15 feet wide of cherty sediments or siliceous iron formation composed mainly of 2- to 4-inch beds of grey to bluish grey silica. Within this band and parallel with it is a 6-foot oxidized zone containing abundant fine-grained, massive to disseminated pyrrhotite.

Another band of mineralized iron formation occurs in greenstones on the west bank of Bigstone River about 2,000 feet southwest of the mouth of

(Continued on page 22)

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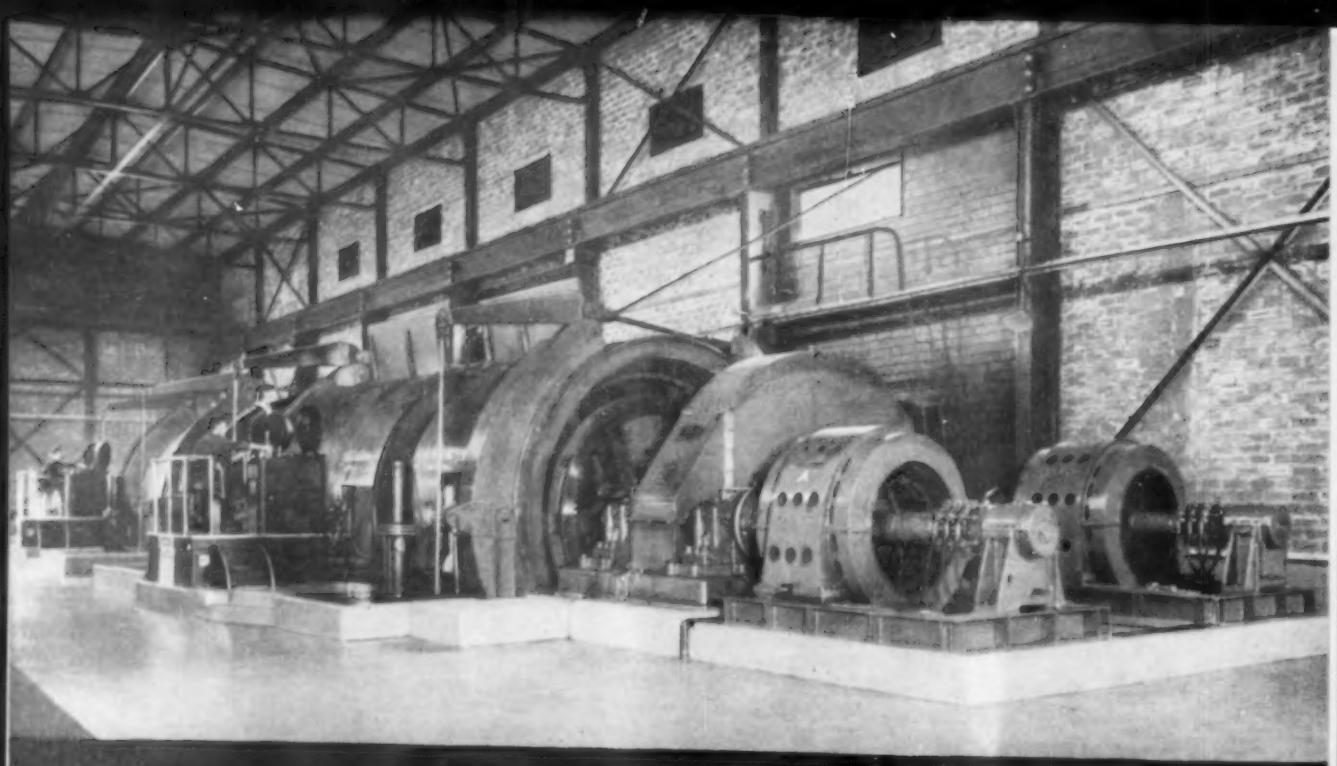

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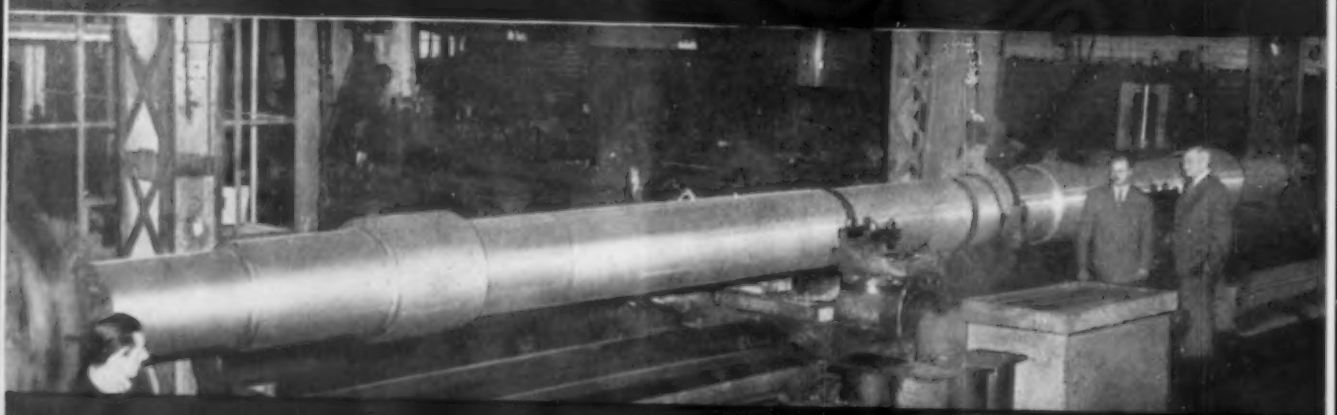

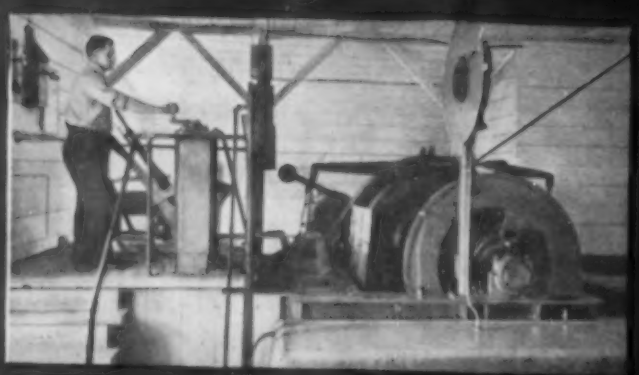

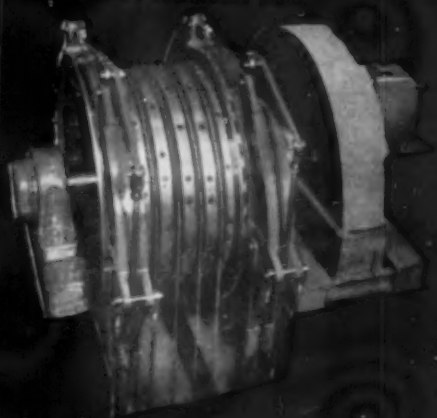

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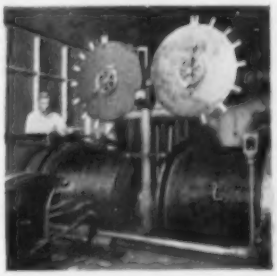

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the Utik River. This band has an exposed width of 15 feet, strikes north, and dips west at 60 degrees. The beds in the band are strongly drag-folded and are 1/16 to 2 inches wide, although most of them are ½ to ¾ inch wide. Dark grey beds, rich in magnetite, alternate with light grey to dark bluish grey siliceous beds. A conformable zone about 5 feet thick within the band contains much pyrite.

On an islet in the western part of High Hill Lake a prospect pit has been put down on a pyrrhotite-bearing zone in greenstone. Pillows in the greenstone strike at 65 degrees and face northwest.

Utik Lake-Bigstone Lake Belt

This belt of volcanic and sedimentary rocks has a maximum width of 3 miles and has been traced eastward from the vicinity of Allbright Lake, west of the map-area, through Utik Lake to a point 5 miles east of Bigstone Lake, a distance of about 45 miles. The belt may continue farther east but bedrock is obscured by glacial drift in this section.

Although the belt consists mainly of basic to intermediate volcanic rocks and their metamorphosed and altered equivalents, it contains in some places at least 4 bands of sedimentary rocks up to 1,000 feet thick and including conglomerate, greywacke, quartzite, nodular cordierite schist, garnetiferous plagioclase-biotite-quartz gneiss and schist, and iron formation. At Bigstone Lake these sediments have been partially granitized. The belt also contains several sills up to 100 feet or more wide of diorite, diabase, and gabbro as well as small amounts of rhyolite and other acidic volcanic rocks.

All of the beds and flows within the belt face southward and most of them dip steeply in this same direction. Because of this it is assumed that they represent the south limb of an anticlinal fold and that the north limb of this fold has been cut off by faulting. Furthermore at Utik Lake the Utik Lake strike fault occurs along and near the south side of the belt.

Fine-grained, disseminated to massive sulphides are fairly abundant at Utik Lake in a few zones and bands in both the volcanic and sedimentary rocks. Pyrrhotite is most plentiful, followed by pyrite, arsenopyrite, and chalcopyrite. Most of the exposed mineralized zones parallel the trend of the enclosing rocks and are less than 100 feet wide. Some of the more interesting areas for prospecting lie along the two regional faults beneath the waters of Utik Lake.

The Utik group of 33 mining claims was staked in 1951, 1952, and 1953 by Kay Lake Mines, Limited, to cover a copper discovery on the south shore of a peninsula in the northern part of Utik Lake at the west edge of the map-area. In 1952 the group was mapped geologically and early in 1953 a magnetic survey of claims- 1 to 18 was made. In March, 1953, the discovery showing and some of the magnetic anomalies were tested by 8 X-ray diamond drill holes totalling 783 feet. The results of this work were disappointing All but 4 of the group of claims have since lapsed.

The discovery showing on the Utik group consists of an oxidized, mineralized shear zone 3 to 5 feet wide and traceable along the shore of the lake for 75 feet. The zone lies in fine- to coarse-grained, dark greenish grey anthophyllitic, amygdaloidal greenstone along the contact of this rock with greywacke and conglomerate. This contact and the mineralized zone strike at 75 degrees and dip about 80 degrees north. The zone contains several per cent of pyrrhotite in disseminated form and in small patches of massive material. It also contains a few per cent of disseminated pyrite and chalcopyrite and, locally, a few tiny veinlets of chalcopyrite. Some of the chalcopyrite has replaced fibrous, radiating anthophyllite and is pseudomorphous after it. A sample from the discovery trench is reported to have assayed 4.4 per cent copper and nil nickel. A drill hole which cut the mineralized zone 40 feet below the discovery trench is reported to have shown 0.12 per cent copper in 18 inches of core containing much pyrrhotite. Another hole drilled through the mineralized zone in this vicinity is reported to have shown disseminated chalcopyrite in 82 feet of core, with 14 feet of this core showing abundant pyrite and pyrrhotite.

About 3,400 feet north of the copper discovery an oxidized mineralized shear zone at least 100 feet wide is visible for 300 feet along the south face of a hill. The zone strikes at 80 degrees and dips south at 80 degrees. For most of the length exposed it lies along the north contact of a band of sediments with silicified, amphibolitic greenstone. The sediments consist of conglomerate and quartzite and they contain 15 to 20 per cent of fine-grained, bright green and yellowish green minerals, probably pyroxene and epidote. Very fine-grained, disseminated pyrite and pyrrhotite occur throughout the zone in amounts up to about 4 per cent.

Wright-Hargreaves Mines, Limited staked the Dog group of twenty-seven mining claims in March, 1953, immediately east of the Utik group. The ground was prospected during the summer of 1953 and some sixty trenches totalling 16,845 cubic feet were dug, mainly in overburden. This work disclosed small amounts of disseminated chalcopyrite, pyrrhotite, and pyrite in a drag—or cross-folded band of cordierite schist near the centre of the group. At this location the band contains much radiating anthophyllite. About 2,000 feet northwest of this section several lenses of pyrite were found in a northeasterly trending sheared and brecciated zone 7 feet wide in pillowed greenstone.

Sulphides also occur at Utik Lake at several places outside of the two claim groups described above. One of these is on the northeastern end and north side of the peninsula north of the Dog group. Three parallel oxidized bands

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Mines Department Offices

at

TRAIL, B.C.

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from 15 to 20 feet apart are visible along the shore here for 1,000 feet or so, striking a little north of east and dipping south at 75 degrees. The north band is eight inches wide, the middle one six to seven feet wide and the south one six to twelve inches wide. The bands contain much disseminated to massive pyrite and pyrrhotite, with traces of chalcopyrite locally. The mineralization is in and along the contacts of bands of quartzite and quartz-biotite gneiss in greenstone. Claim posts and trenches found here are estimated to be more than 20 years old.

Milligan and Take (12) report the occurrence of pyrrhotite and arsenopyrite in banded iron formation on the northeast tip of the largest island south of the Dog group of claims. On an islet off the southwestern end of this island a northeasterly trending, weakly oxidized zone 4 feet wide in pillowed greenstone contains one to three per cent fine-grained pyrite and pyrrhotite in garnetiferous amphibolite. The green stone on the south side of the islet contains roundish amygdules of soft, chalky, white material.

Semple Lake Belt

This belt of volcanic and sedimentary rocks has a maximum width of 3 to 4 miles and has been traced eastward for 50 miles from Cotton Lake, west of the map-area, through Bear, Dobbs, Powstick, and Semple Lakes to Semple River where it joins the Knee Lake belt and continues eastward for many miles. It is actually the northern branch of the western part of the Knee Lake belt.

Within the map-area the eastern part of this belt consists mainly of basic to intermediate volcanic rocks and their metamorphosed equivalents, but it also contains several bands of rhyolitic to dacitic volcanics and some conglomerate, greywacke and other sediments. West of Dobbs Lake the belt narrows to less than a mile wide and consists mainly of sediments. The few observations made indicate that all beds and flows face south, but outcrops are scarce and widely separated and the structure of the belt is therefore incompletely known. The Bear Lake strike fault extends into the area from the west and has been traced eastward almost to Semple Lake. It has substantial zones of silicified schist associated with it between Dobbs and Semple Lakes. In this section also other smaller (?) faults trending both northeast and northwest occur and the strata show some drag folding.

Although some very old claim posts were noted on the shore of Powstick Lake, between Semple and Dobbs Lakes, very little prospecting has been done on this belt, possibly because of scarcity of outcrops. Disseminated pyrite occurs at several places along and near the Bear Lake fault and in a band of slate or black, silicified schist a short distance north of a band of conglomerate on the east shore of Powstick Lake. At the narrows in Semple Lake an oxidized, mineralized zone 10 feet wide and at least 1,200 feet long in amphibolitic greenstones strikes at 105 degrees. The zone is reported to contain a few per cent of disseminated pyrite, chalcopyrite, and possibly arsenopyrite. In general the part of the belt lying between Semple and Dobbs Lakes shows more faulting, drag folding, silicification, and sulphide mineralization than the rest of the belt within the map-area and this section therefore is considered to be the most favorable part for prospecting.

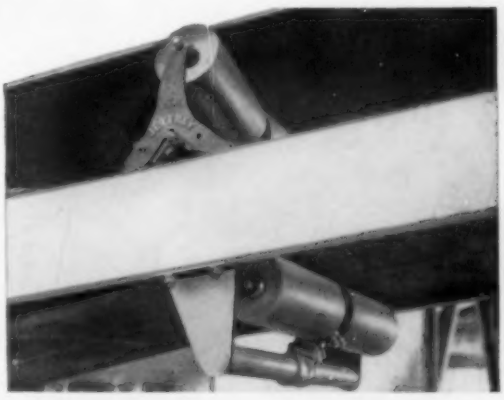
Granitic Areas

The large areas of granitic rocks shown on the accompanying map, although generally unfavorable for occurrence of mineral deposits, contain substantial amounts of granitized and hybrid gneisses and some fairly large inclusions of volcanic and sedimentary rocks and therefore cannot be entirely eliminated as possible sources of valuable minerals. Small amounts of sulphides have been found in them at several points. Milligan and Take (12) report small amounts of columbite-tan-

(Continued on page26)

belt idlers

MADE IN CANADA



Jeffrey Belt Conveyor Idlers give maximum efficiency, dependability and economy.

Illustrated is a close-up of a belt conveyor with a troughed carrying idler, and the latest design self-aligning two-pulley inclined pivoted-type return idler. This self-aligning idler has proven itself in service as the most efficient type to keep expensive conveyor belts running true. Note that there are no outside guide rollers to damage the edges of the belt.

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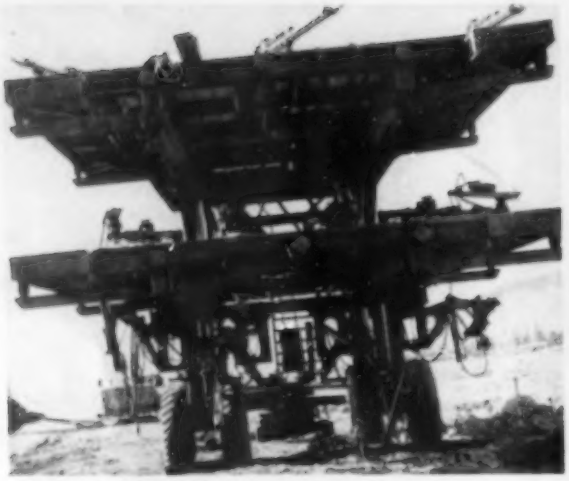
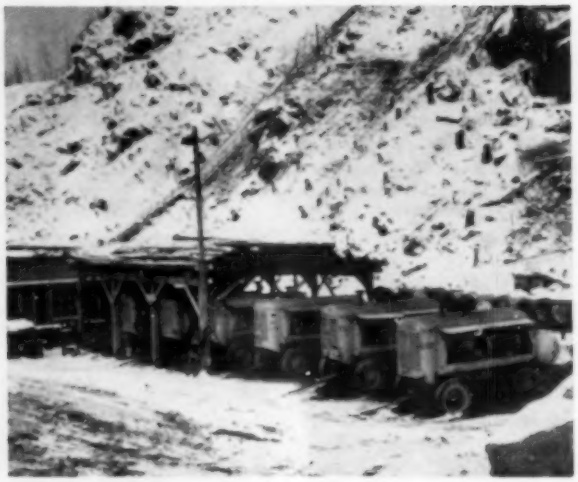
Bersimis Power Project

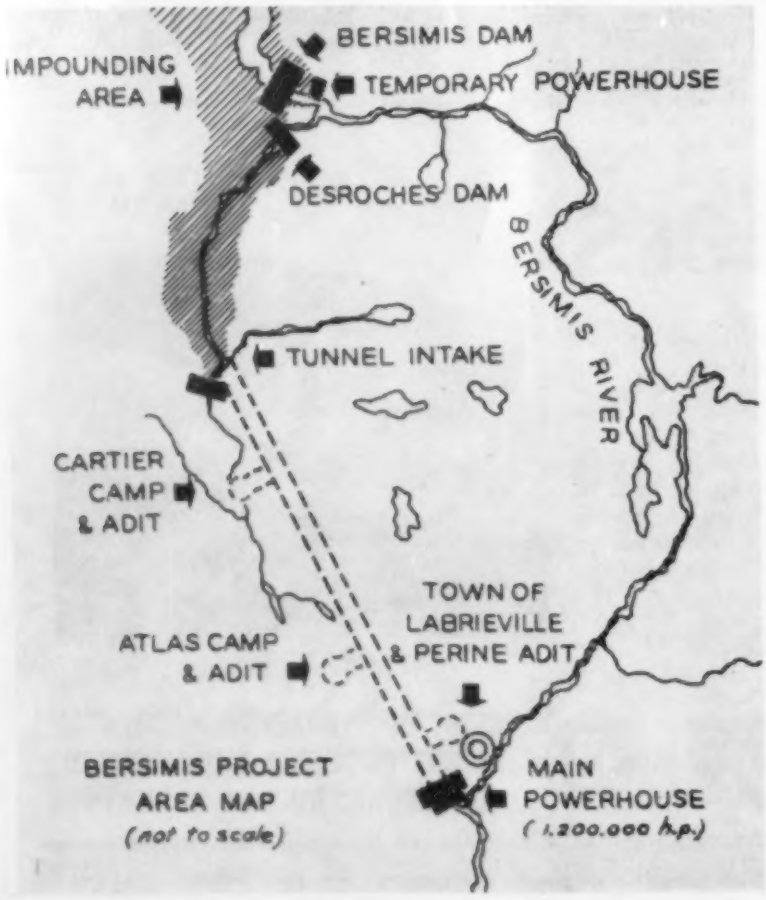
(Continued from page 8)



This manifolded battery of IKA-315 c.f.m. portable compressors is supplying air power for rock drills working on the tunnel portal.



This rubber tire mounted drill jumbo was used to drill the power house access and tailrace tunnels. (100,000 cubic yards of rock). It carries 4 DA-35 drifters underslung from the lower deck, 4 upright on the lower deck and 3 on the top deck. All are mounted on model C-789 jumbo booms.



and its effect on the power distribution system of the Province will help make productive.

A Ranking Project

Taking 1,200,000 h.p. from a water and mountain complex of virgin wilderness is a job ranking with other great projects of our days, such as the B.C. Alcan job and Ontario Hydro-Quebec's Sir Adam Beck (2).

The similarities become evident as we trace out the fundamental operations which right now constitute projects within projects along the Bersimis.

First we have 2 huge dams on the Bersimis and Des Roches Rivers which impound the waters of Lac Casse and Pipmaucan Lake into a 385 billion cu. ft. reservoir. Cut-off dams will be required at the western end of this basin to keep Bersimis water from piling back into the neighboring watershed.

The impounded water, usable between elevations 1275' and 1300', will follow a natural channel from Lac Casse to the intake of a 7½ mile, 31½ ft. diameter, concrete lined tunnel, which takes it through the main powerhouse—and thence back into the Bersimis. A regulated flow of 9,320 cu. ft. per second through this system will produce over 1,000,000 h.p.

The Dams

The Lac Casse dam will be the larger of two required for effective impounding. It will be 2,100' long, 200' high, 900' wide at the base and 40' wide at the crest.

A smaller dam on the Des Roches River will be of earth fill and rock construction—a nearby quarry will have to produce 5,000,000 cu. yds. of rock for their completion.

At first, coyote tunnels were used in the quarry to establish a face and to get large amounts of heavy rock necessary for basic fill in the dams. These tunnels and their cross-cuts were drilled with jacklegs and mucked with slushers.

As the quarry took shape, the contractor, Angus Robertson Company Limited, reverted to a combination of wagon drills and large diameter blast hole drills, employing for the latter both Bucyrus Erie well-type units and Ingersoll-Rand Quarrymasters. Mucking and hauling is handled by 4-yd. shovels and large trucks of the Euclid type. A thousand tons of dynamite will be necessary to get enough rock fill for both dams.

Each truck load of fill is consolidated by high pressure jets of water as it is dumped onto the dam. This cuts down on the required settling time, makes the fill more impervious and contributes to the success of applying a concrete facing.

The Tunnel

Of relatively large diameter—35', the 40,139' tunnel is being drilled from 7 headings. Going from West to East we come first to the Cartier Construction Company's section of the job, consisting of the intake and two other working faces, one going East and the other driving West toward the intake. Cartier has 2,660 ft. of adit and 16,050 ft. of tunnel.

The mid-portion of the tunnel, responsibility of the Atlas Construction Company, involves East and West headings, 2,500 ft. of adit and 16,050 ft. of tunnel. Perini (Quebec) Ltd. at the discharge end of the tunnel are driving a heading west toward Atlas and East to the point of meeting with the powerhouse penstocks—a total of about 9,024 lineal ft. of tunnel, surge shaft and powerhouse tunnels.

Tunnel Jumbos and Drilling

The drill jumbos being used to drive the tunnel are almost identical from an equipment point of view. Each mounts 20 to 22 C-I-R DA-35 Power Feed Drifters mounted on C-789 hydraulic jumbo booms. In addition each jumbo carries one or more C-I-R R-38 Stoppers which are used to drill pin holes for ventilation pipe mounting, air line and electrical conduit brackets.

Mucking is handled with electric shovels equipped with tunnel booms, and large dump trucks. Accordingly the first deck of the jumbo folds up from the inside to let the trucks pass through during the mucking cycle—each jumbo has two small air hoists for this purpose. A consistent homogeneous rock (granitic gneiss) results in only a slight variance in drill patterns on all 7 faces, a wedge cut with a burn cut inside. Delays are adapted to the local condition of the rock which is faulty in some sections, especially under lakes where leaching has occurred.

Each round consists of over 100 holes 14 feet deep drilled with steel changes of 5, 9 and 14 feet. Some 4,300 tons of 8 inch forcite will be used to complete the tunnel.

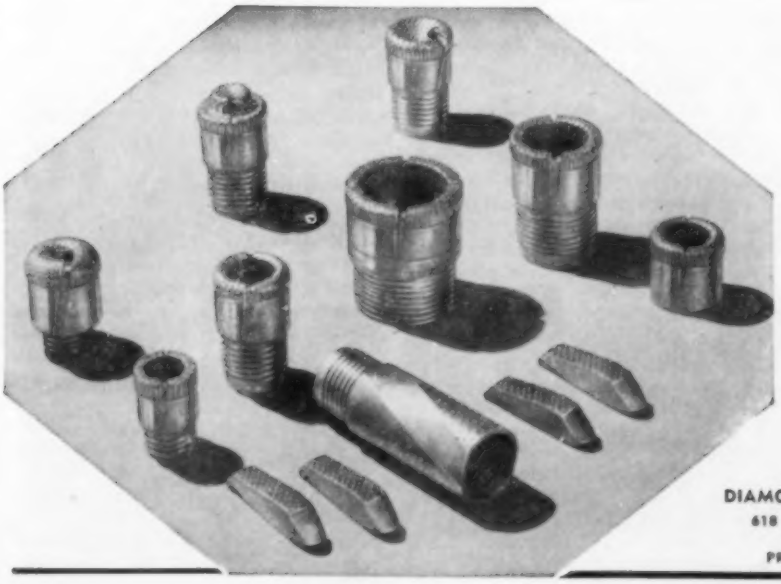
In every case the muck pile is located close to the adit with resulting economies of time on that cycle. At the face trucks are spun on a skid table with a tugger hoist, then backed up to the shovel for their load.

Hydro-Quebec engineers estimate that completion of the tunnel will require the removal of some 2,200,000 cu. yds. of rock—and the tunnel lining will require about 2,240,000 bags of cement for 407,000-odd cu. yds. of concrete.

The Power House

This first underground powerhouse in the province will measure 565' long, 65' wide and 80' high. Generators will be fed from 8 penstocks 12' to 9' in

J. K. SMIT HAS THE RIGHT BIT FOR EVERY DRILLING JOB



Orders can be met immediately—stocks of J. K. Smit drill bits are available at key mining areas across Canada.

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diameter with valves measuring 7'9" in diameter.

Carving out the powerhouse will be a benching operation using a special tractor mounted jumbo. During construction, prior to completion of a concrete arch, the roof will be held secure by rock bolts put in position with an R-38 stopper and a Model 534 air impact wrench. Building the penstocks requires a small diameter pilot raise, later to be ring-drilled to the specified diameter.

The eight 150,000 h.p. generators supplied by English Electric will be the largest single units in existence. They will be driven by Francis type water wheels fed through scroll cases of steel plate.

Power will be generated at 13,800 V/60 cycles. Two 1,000 kva transformers in the powerhouse will provide 575 V power for plant requirements including a 400-ton moving crane necessary to handle the giant generator components.

The Tail Race

760' of the tailrace will run through solid rock in a tunnel 78' high and 48' wide—requiring excavation of 100,000 cu. yds. of rock. The open portion of the tailrace will require removal of some 1,000,000 cu. yds. of rock and sand. The section of the tailrace adjacent to the river will be built behind an 80' cofferdam.

Temporary Power

While discussing the power generation part of the project it is interesting to note that the basic power for construction is also hydro-electric—provided by a once obsoleted plant from near Beauharnois, Quebec, (40 miles from Montreal), which was moved lock, stock and barrel down the St. Lawrence River to Forestville, then 80 miles into the bush to Lac Casse.

Reconstructed between November 1952 and August 1953, this temporary powerhouse now produces 15,000 h.p. to drive air compressors, electric shovels, pumps and many other items of equipment plus providing domestic power for 3 construction camps and a town of 5,000 people. Twenty-five miles of 2,200 Volt secondary transmission line and twenty-five miles of 550/220/110 volt line connect the temporary plant with the various parts of the job. When the main powerhouse goes on line this old plant will be abandoned for the second time in its lifetime.

Main Transmission Lines

The remoteness of the Bersimis project makes the transmission line phase extremely important.

Preparatory work required the aerial survey of 400 lineal miles—photographs taken from a helicopter were laid out as a continuous picture on a scale of 1,000' to the inch.

The right-of-way for a 161,000-Volt line to Chute Aux Outardes will be 150 ft. wide. A double right-of-way will lead to Quebec. A problem is the 10,000-odd wooded acres that must be cleared. Except for the Saguenay River crossing, the towers will be about 138 ft. high with average spans of 1,000 ft.

To cross the river requires a 5,000 ft. span between 200-ft. towers located on 600-ft. hills. Even then the water clearance will only be 170 feet.

Giant Steps

. . . . And so a power giant — the Bersimis, whose waters mingled with those that swept past the bow of Jacques Cartier's ship as he made his way up the St. Lawrence—has come into its own, not only as a vital part of Quebec's mining industry, but as part of a benevolent New-World civilization based on technology for human good.

Prospects of Knee Lake Map Area

(Continued from page 23)

talite in pegmatite 4,000 feet north of Bear Lake near the west edge of the map-area. They also report grains of allanite up to ¼ inch across in pegmatitic phases of the granite near the outlet of Bigstone River from Bear Lake.

Two high gravity anomalies are shown by the Gravity Anomaly Map of Manitoba (6), one of these being in the western part of Stupart Lake and the other at a small lake just west of Gowan River. Both of these anomalies are in areas of granite or granitized gneisses and as they are drift-covered no explanation for them was found in the field. As the anomalies are greater than most of those found along the Mystery Lake nickel-bearing belt, it is possible that they are due to sills or dykes of ultrabasic rock. A magnetic anomaly was noted 4½ miles west and slightly south of the gravity anomaly at Stupart Lake.

ACKNOWLEDGMENTS

Although the map-area has not a single resident, the writer is indebted to many persons for assistance in making the reconnaissance survey of it. First of all he wishes to thank the members of his field party, all of whom performed their duties capably even under conditions which were often difficult and sometimes hazardous. Independent sub-parties were led by John C. Davies, William D. Tedlie, and Harold Rasian. J. F. Davis, M. Maki, M. Moar, V. D. Nelson, and C. Spence gave excellent support as assistants and canoemen.

Much valuable information on some of the mineral occurrences and properties was given by George H. Salton, H. T. Hurley, Oliver Lindal, R. B. Weenusk and P. Stewart. G. H. Charlewood and G. C. Milligan, of the Manitoba Department of Mines and Natural Resources, kindly supplied advance geological and other information of value. The survey was facilitated by the ready cooperation of J. J. Wood, W. E. Senior, W. Grant, and R. C. McMurchy. Pilots W. D. Eaton and L. Brodeur, of Central Northern Airways Limited, provided first class aircraft service. J. F. Wright and C. H. Stockwell, of the Geological Survey of Canada, very kindly read the manuscript and gave helpful suggestions.

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COWICHAN APPOINTMENTS

JOHN D. AUSTIN

Named resident engineer by Cowichan Copper Co. Ltd., Mr. Austin took over his duties at the mine near Duncan, B.C., during the latter part of April. He is a graduate of the Royal School of Mines, with experience at Falconbridge Nickel Mines and at Madsen Red Lake Gold Mines.

Four women were among 105 persons who enrolled in a class for prospectors started by the University of Alberta.

MAPPING IN MANITOBA, 1955

The Manitoba Mines Branch is undertaking the following field investigations during 1955

1. Lynn Lake area — regional study and compilation: Party chief—G. C. Milligan.
2. MacBride Lake area — latitude 56° 45' to 57° 00', longitude 99° 45' to 100° 00'. Scale of mapping — one inch equals one-half mile. Party Chief — Lionel Kilborn.
3. Snow Lake area — Tp. 68, Rge. 17 WPM. Scale of mapping — one inch equals 1000 feet. Party Chief: G. A. Russell.
4. Bird Lake area — east half Bird Lake. Scale of mapping — one inch equals 1000 feet. Party Chief: J. F. Davies.
5. Southwestern Manitoba. Study of Mississippian strata: H. R. McCabe.

Department of Mines and Natural Resources

WINNIPEG, MANITOBA

Hon. Chas. E. GREENLAY, Minister J. G. COWAN, Q.C., Deputy Minister

ViolaMac Mines Ltd. Exploring Manitoba Lithium Possibilities

A LITHIUM BOOM in Manitoba may be the result of exploratory work in the province by ViolaMac Mines, a profitable British Columbia base metal producer, which has acquired a promising discovery at Cat Lake, approximately 35 miles northeast of Lac du Bonnet. The 20-claim group comprises some 1,000 acres in the heart of the new lithium belt just gaining prominence in the province.

Lithium is not a new discovery in Manitoba. Its presence has been known for years, but no very active steps have been taken to develop it. But recently, in addition to its many uses in the industrial field it has been found that it may have definite value as a source of atomic fuel, not only for the making of bombs, but also for peaceful production of power. A recent article in the Wall Street Journal, extracts from which we publish in this issue, reveal how important this development may be.

Equally important is that development in Manitoba has now captured the interest of ViolaMac Mines, Ltd., headed by Viola R. MacMillan, well-known and successful Canadian prospector and developer, and the energetic president of the Prospectors and Developers Association. In the report for 1954 Mrs. MacMillan states that ViolaMac Mine, New Denver, B.C., enjoyed another profitable year and that although gross tonnage mined, 22,628 tons, was less than in the previous year by 4,619 tons, the mine operating profit after depreciation, but before taxes, of $474,451, compares well with $475,846 in 1953. Net profit was equal to better than 10 cents a share.

Initial Outlay of $75,000

ViolaMac has now committed itself to an initial expenditure of $75,000 on its new Manitoba property this summer. This work entails the staking of additional claims on behalf of the company and the immediate undertaking of a diamond drilling program by two drilling rigs now on the ground. A surface crew is already on the property laying out the proposed season's work and erecting camp buildings to house a crew of 18 men, including two geologists and property manager, George A. MacMillan.

The company's Manitoba lithium property ties onto the southerly strip of Maskwa Nickel—Chrome Mines (controlled by Falconbridge Nickel Mines—the large nickel-copper-cobalt producer from Sudbury). The ground is approximately seven miles west of the Lithium Corp of Canada mining claim, recently reported acquired for $200,000 by Toronto mining interests.

Original surface work completed on ViolaMac's Manitoba property by staker John Donner, Winnipeg, indicated nine lithium showings scattered along a 1,800-ft. length of the acreage. Other lithium exposures have been discovered 1,300 ft. west again to suggest an overall possible length of 3,100 ft. on this property.

Some promising assays were secured from the nine surface trenches opened up across widths ranging from 5 ft. to 14 ft. at intervals along the 1,800-ft. length. These results, coupled with the prominent part lithium is now playing in atomic affairs, influenced ViolaMac Mines to enter the new lithium program in Manitoba.

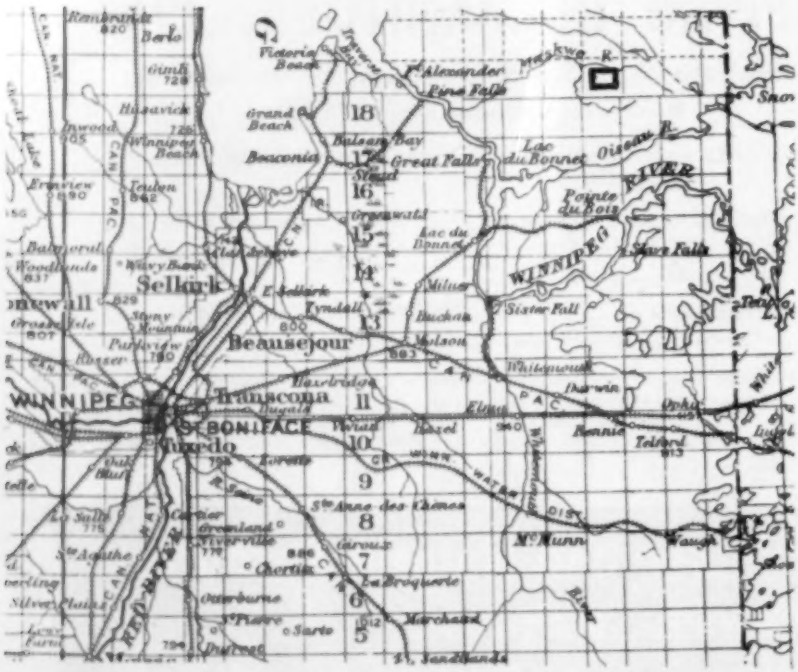
First Showings

The first showing, near the westerly end of the first 1,800-ft. length, averaged 1.90% lithia across 2.5 ft. with a section slightly east assaying 2.23% lithia over 8 ft. This trench has been opened for an 80-ft. length with the most easterly end of the trench assaying 1.65% over 3 ft.; 1.96% across 2.5 ft. and 2.70% across 1.25 ft.

Another showing 700 ft. east again averaged 0.82% lithia across a 6-ft. width in a shoot off the main occurrence. Some 900 ft. east again channel sampling across a trench in the main vein gave 1.55% over 7 ft. while a short distance east sections averaged 1.42% across 2.5 ft.; 2.00% over 3.5 ft. and 1.48% lithia across a 3-ft. width. Other exposures to the east averaged 1.40% over 1 ft.; 2.12% across 4 ft.; 2.07% over 2.5 ft.; 1.85% across 3 ft.; 1.52% over 7.3 ft. and 1.19% lithia over 5 ft.

Diversified Operations

ViolaMac has many interests in addition to its high-grade lead-silver-zinc operation near New Denver, B.C. Commencing about mid-year 1954, the company started a practice of rapid diversification of operations into other



Blocked out square at top, right of map shows approximate location of area staked out by ViolaMac Mines Limited for drilling in the lithium belt of Manitoba. The holdings are only one hour's flying time from Winnipeg and are within easy reach of Lac du Bonnet. The location is well favored by proximity of the Manitoba Hydro Commission's power lines, some eight miles to the east.

phases of the mining and oil industry throughout Canada. Working capital of over $900,000 and a substantial investment portfolio at December 31, 1954, has permitted the company to capitalize on some interesting mining situations, such as the new venture into Manitoba.

The company at present owns 1,600,000 shares of Lake Cinch Mines Limited —now diamond drilling and preparing shaft sinking plans for its uranium property at Beaverlodge Lake, Saskatchewan. Since assuming control of this company late in 1954, indicated ore reserves have been increased several fold by diamond drilling and ViolaMac's market value of shareholdings in this company have increased over $5,000,000.

Besides this major shareholding ViolaMac also owns controlling interest in Lone Bachelor Mines which is gearing for production by opening lead-silver-zinc ore on two levels adjoining ViolaMac's British Columbia mine. ViolaMac also owns 840,000 shares of Camarillo Oils, which in turn holds a 1.29% interest in 659,000 acres in the Grande Prairie sector of Alberta where oil staining has been secured in the first drilling venture, the Kakwa River No. 1 well. This acreage is southeast of the Stanolind Chinook Ridge No. 1 well.

ViolaMac, in addition, owns over 1,000,000 shares of Glencair Mining Co., whose property is immediately south and east of the major Gunnar uranium mine on St. Mary's Channel, Beaverlodge Lake district of Saskatchewan. Other holdings include 285,900 shares of Uranium Ridge Mines; 250,000 shares and outstanding options on additional shares of Gateway Uranium Mines and 391,050 shares of Consolidated Golden Arrow Mines.

Big Increase in Demand for Lithium Indicated

TODAY'S uranium-fueled atomic reactors could be rendered obsolete by the employment of relatively cheap lithium as a prime source of atomic fuel, says Sydney B. Self and Clare M. Cotton in an article in a recent issue of the Wall Street Journal.

They point out that lithium used by Thomas E. Edison in the 1880's for electric batteries has become important in recent years in the manufacture of ceramics, lubricants, pharmaceuticals, bleaches and in metal and chemical products.

Now, they reveal, nuclear scientists have become interested in lithium because they discovered it was "a short cut in the manufacture of a relatively simple H-bomb small enough to be carried in a plane. This was done through the use of a combination of lithium with heavy hydrogen known as lithium deuteride.

"Lithium is more abundant than uranium and its price is lower. Apparently a given quantity of lithium could yield more energy than the same amount of uranium if technical problems now being tackled are solved."

N.W.T. AND YUKON PRODUCTION IN 1954 EXCEEDED $20,000,000

G. H. Finland, secretary-manager of the Edmonton and Northwest Chamber of Mines and Resources, says that production from mines in the N.W.T. and the Yukon last year exceeded $20,000,000, a gain of at least $2,000,000 over the previous year. These figures do not include production in the Beaverlodge uranium field.

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WINNIPEG REGINA SASKATOON — Ashdown's — CALGARY EDMONTON LETHBRIDGE

Manitoba Drilling Activity Slowed by Road Bans in March

By LESLIE ORR ROWLAND, Editor, Oil in Canada

MANITOBA'S drilling activity was slowed by the coming of spring and the imposition of road bans during the first half of April, so that even development well completions were headed for a decline from the March figure although they promised to be above the nine completions in April last year. Indications were that wildcat drilling would be substantially below the eight wells completed in April 1954.

To offset the small number of wildcat completions for the first third of the year, news of two major farmouts from Souris Valley Oil Co. Ltd. and several smaller farmouts from other companies promised to build up a heavy program of wildcat drilling for a little later in the season. Half a dozen wells are to be started as soon as the road bans are lifted, assuring a comparatively high level of wildcat activity in May and June.

Another cause for optimism in the industry was the report on production for February, the latest month of record, which showed that Manitoba wells had again broken all previous records to set a new high figure for daily average production, although the gross figure was slightly lower than in January because of the shorter month. The daily average of 9,321 barrels was up nearly six per cent from the January figure of 8,826 barrels per day, and the total production of 261,004 barrels was only down a little from January's 272,815 barrels. Completion of a large number of wells in both February and March gave indication that the new wells coming on production would probably more than offset the lower allowables affecting only a few of the largest Daly field wells from March 1 on, so that further new records should be established when March and April production data are released.

Daly Largest Contributor

The Daly oil field continued to make the largest individual contribution to February production. Its 107,382 barrels amounted to 41 per cent of the Manitoba total. Cumulative production for the two months was 220,368 barrels and alltime cumulative rose to 2,120,345 barrels, or 61 per cent of alltime cumulative for the whole province which was 3,457,326 barrels.

Virden-Roselea, in second place, produced 76,266 barrels, also down a little from January, to make its two-month total 159,601 and its alltime cumulative production 838,308 barrels. North Virden, the companion field to the north, exceeded its January production with 27,753 barrels for a two-month total of 54,079 barrels. Its alltime cumulative total was raised to 215,637 barrels.

Most of the smaller fields showed declines in total production from the long month of January. Woodnorth yielded 16,943 barrels for 1955 total of 35,597 and cumulative 83,636 barrels. East Cromer produced 13,494 barrels to bring its two-month total up to 28,670 and its cumulative to 56,063 barrels. March will mark the last appearance of this pool as a separate unit, because it was incorporated with the Daly field by order of The Oil and Natural Gas Conservation Board, effective April 1. Its development has proved it to be on the same structure as the original Daly field, to which it has now been connected by intermediate drilling northwest from its discovery well and southeast from the south end of Daly.

Pierson production was 5,671 barrels for a two-month total of 12,252 and cumulative 37,370 barrels. Ebor showed a large increase over January, its 4,437 barrels making a two-month figure of 7,120 and cumulative 9,605 barrels. Whitewater wells yielded 2,726 barrels for 5,624 barrels in the two months and 34,773 barrels cumulative production. Lulu Lake produced 1,841 barrels for a two-month total of 3,545 and cumulative 5,549 barrels. Smallest production was from Tilston, whose 365

Stratigraphic Section — Southwest Manitoba

J. R. OWER, MARCH, 1954

Age	Unit	Equivalent		Sub Unit	Average Thickness	Gross Lithology
CRETACEOUS 2300' MAX.	A	RIDING MOUNTAIN or PIERRE		A	900-1000	Grey Shale
	B	BOYNE or NIOBRARA		B-1	70	Speckled Calcareous Shale
		MORDEN or CARLISLE		B-2	230	Grey and Black Shale
	C	FAVEL or GREENHORN		C	110	Speckled Calcareous Shale
	D	ASHVILLE or GRANEROS		D-1	140	Grey and Dark Shale
				D-2	200-250	Shale, Lenses Coarse Quartz Sand
JURASSIC 400'-1200'	A	(PROBABLE MORRISON or CRETACEOUS) SUNDANCE		A-1	200	Sandy Shales, Sand and Limy Sand
				A-2	400	Shale; Lime and Sand at Base
	B	GYPSUM SPRINGS or AMARANTH		B-1	0-20	Limestone; Minor Chert and Anhydrite
				B-2	0-150	Anhydrite
				B-3	0-120	Red Shale and Siltstone
MISSISSIPPIAN 0-1000'	A	MADISON (SOME MISSION CANYON) MAINLY LODGEPOLE		A-1	100	Dolomite, Bands of Anhydrite
				A-2	50-100	Limestone, often Porous or Crinoidal
				A-3	100-200	Shaly Limestone, Chert
	B	BAKKAN		OB-1	-10	Black Shale
				B-2	0-20	Sand and Silt
DEVONIAN 1900' MAX.	A	LYLETON THREE FORKS		A	100	Red Beds
	B	JEFFERSON (UPPER PART) NISKU + DUPEROW		B-1	100	Dolomite, some Anhydrite
				B-2	300	Limestone, Dolomite, some Anhydrite
				B-3	170	Porous Dolomite
	C	JEFFERSON (L.P.) or MANITOBA	SOURIS RIVER	C-1	300	Limestone, Shale and Anhydrite
			DAWSON BAY	C-2	220	Limestone, partly Organic
	D	ELK POINT	PRAIRIE	D-1	400	Salt and Anhydrite, Red Shale
			WINNIPEGOSIS	D-2	40-100	Dolomite, partly Organic
			ASHERN	D-3	30	Red Beds
SILURIAN 300'	A	INTERLAKE		A	300	White Dolomite, Sand at Base
ORDOVICIAN 900'	A	STONY MOUNTAIN	GUNTON	A-1	120	Pale Dolomite
			ST. MTN. SHALE	A-2	80	Shale and Shaly Limestone
	B	RED RIVER		B	450-500	Limestone and Dolomite
	C	WINNIPEG		C	100-200	Green Shale, Sand at Base
PRE CAMBRIAN						Igneous and Metamorphic Rocks

barrels brought the year's total up to 2,154 and cumulative to 30,928 barrels.

The California-Standard South Regent 6-7 discovery well, completed early in the year, made its first production in January and increased it substantially in February to 1,326 barrels for cumulative production of 1,889 barrels.

Standing Unchanged

Standing by companies was unchanged from the record of the past few months. The California-Standard Company was far ahead of all others, with production of 129,083 barrels, an average of 4,610 barrels per day, just under half the total for the province. The team of The British American Oil Company Limited and Union Oil Company of California was second with 44,433 barrels, an average of 1,587 barrels per day or 17 per cent of the provincial total. Canadian Superior Oil of California Ltd. was third with 26,464 barrels and Imperial Oil Limited fourth with 18,869 barrels. No other company or group produced more than 10,000 barrels.

Out of the 335 wells capable of producing oil, 315 were actually on production for the month, including 139 in the Daly field, 74 in Virden-Roselea, 48 in North Virden, 18 in East Cromer, 12 in Woodnorth, 7 in Pierson, 5 in Whitewater, 5 in Ebor, 3 in Lulu Lake and one each at Tilston, Bekker, Coulter and South Regent.

The effect of growing water intrusion in the lush flowing wells of the southwestern sector of the Daly field was conspicuous in the fact that only one well in this area made over 3,000 barrels in February. The B.A.-Union McDonald 1-31 well, lsd 1-31-9-28WPM, produced 3,302 barrels, or its full allowable of 120 barrels per day average, bringing its cumulative production up to 19,068 barrels. The nearest to this production were the adjoining B.A.-Union McDonald 8-31 well to the north, which produced 2,349 barrels, and the two nearby Cal-Standard wells on the adjoining section to the east. Cal-Standard Daly Province 6-32, lsd 6-32-9-28WPM, half a mile east of the 8-31 well, produced 2,523 barrels to raise its cumulative production to 32,911 barrels. Its south offset, Cal-Standard Daly Province 3-32, lsd 3-32-9-28WPM, produced 2,312 barrels for cumulative 29,806 barrels.

Among the highest producers, in second place for total February production, was the veteran Cal-Standard Daly Province 3-12 well, lsd 3-12-10-28WPM, one of the earliest completions in the Daly field, which lengthened its lead over all other wells for top cumulative production at 85,326 barrels. Its increased productivity due to the success of the water flooding project which was instituted two years ago was apparent from its 2,773 barrels or nearly 100 barrels per day in February, an increase of more than 20 per cent over January in daily average.

Its neighbor on the west side, Cal-Standard Daly Province 4-12, continued to hold second place, February production of 1,722 barrels raising cumulative to 60,833 barrels. Close behind in third place was Canadian Pipelines Cruickshank 5, with current production of 1,617 barrels for cumulative of 55,195 barrels. Fourth was the Virden-Roselea discovery well, Hi-Tower Roselea 9-28, which produced 2,067 barrels for cumulative 54,386 barrels.

Curve Declines as Predicted

Production experience over the past few months, as shown on the records of representative individual wells, appears to substantiate the decline curves projected by Dr. J. C. Sproule in his analysis last summer, which indicated a fairly steep decline from the initial period of flush production. The reduction in Daly field allowable from 120 to 75 barrels per day, commencing March 1, will tend to reduce the sharp contrast between the initial production rate and the sustained average rate over the life of the well, in the case of the more productive wells, but will have no effect on the majority of the recent completions, which have not been able to produce initially at as much as the new 75-barrel rate.

The latter part of March and the month of April saw no further dispositions of provincial government rights by way of Crown reserve sales, but was marked by the large farmout of nine blocks of acreage by Souris Valley Oil Co. Ltd., in which nine wildcat wells are to be drilled in the next few months.

The first farmout, of 5,280 acres, was made to the same group of Alberta companies which drilled several dry holes in Manitoba last summer. These companies are Anglo-Canadian Oil Company Limited, Kroy Oils Limited and Bralsaman Petroleums Limited. The farmout covers five blocks in southwestern Manitoba, spread over the territory between the Coulter marginal oil discovery well of Pascar Oils Ltd. and the Pierson oil field. Its objective appears to be the picking up of a new pool along a possible trend between these two Mississippian oil production areas.

The first well, Anglo et al Souris Valley Shannon 1-22, lsd 1-22-2-28WPM, is six miles southeast of the Pierson field and eight miles northwest of the Pascar well. The nearest completion is the Anglo Skelton 4-14 dry hole five miles northeast. This well was just started when the road bans caught up with it and it was standing with surface casing set at last report, in the third week in April. Souris Valley retains a one-half carried interest in the 5,280 acres.

A second major farmout was made at the middle of April to Rio Prado Consolidated Oils Limited, covering 2,960 acres in the same general area under similar arrangements. Four wells are to be drilled under this agreement, and the program will be carried out continuously as soon as the rig can be moved on to the first site when the road bans are lifted.

Souris Valley owns freehold leases on an additional 31,000 acres of oil and gas rights in the same region, which it plans to develop either on its own or by other farmouts during the coming season.

Wildcat Comes to Grief

The Texaco-McColl Graham Creek A4-29 wildcat, lsd 4-29-3-28WPM, came to grief after the encouraging shows of oil which prompted the operators to set casing for production tests in March. The well was abandoned at total depth of 3,270 feet (1,717 feet subsea), failing, as had been hoped, to extend the Pierson field some 3 miles to the northeast. No further sites have been staked yet on the large block which the team bought last summer at the first Manitoba Crown reserve sale, on which this was the first wildcat to be drilled.

Another disappointment of early April was the failure of the Imperial Virden 13-8-10-26 extension try, lsd 13-8-10-26WPM, 1¼ mile northwest of the successful Imperial Virden 5-9 Mississippian discovery well southwest of the Virden-Roselea field. This well was abandoned after drilling to 2,268 feet (784 feet subsea).

Imperial has now proceeded with a cautious stepout development program of which the first stage will involve the drilling of three wells immediately offsetting the discovery well, in the same section as the failure. These are Imperial-Virden 7-8M-10-26, 8-8M-10-26 and 9-8M-10-26. They are on the adjoining two quarter sections, offsetting the discovery quarter to the west and diagonally to the northwest. Their results will be a good indication of whether Imperial has found a new pool for its $8,000 investment in the Dominion Government Crown reserve sale of last summer. This was the cash bonus it paid for the discovery quarter. It holds a lease of the whole offsetting section.

A rank wildcat venture in the extreme southwestern corner of the province was the other abandonment in the March-April period. E. Donnelley Coul-

ter 1-3, lsd 1-3-1-27WPM, drilled by Ward Williston of Minot, North Dakota, was completed as a dry hole at total depth of 3,555 feet (2,060 feet subsea) without finding any oil encouragement. The site was 3½ miles southeast of the Pascar Westover discovery well and 1½ miles southeast of a group of three dry holes, the first three deep test wildcats drilled in Manitoba by Souris Valley in 1949 and 1950.

Several interesting new wildcats staked and spudded in the review period were caught in the road bans and are standing awaiting weather conditions to permit them to resume operations. Imperial West Brenda 13-17-4-26, lsd 13-17-4-26WPM, ground level elevation 1,456 feet, is still a location, waiting to move a rig onto the site. It is in a rank wildcat area, four miles south of Melita, halfway between the Cleary McCallum 4-32 and J. P. Owen Coulter 5-32 dry holes.

Near Maon, in wild country north of Oak Lake, the team of McCarty and Coleman, of Great Falls, Montana, spudded its first 1955 Manitoba wildcat, McCarty & Coleman Maon 12-15, lsd 12-15-9-25WPM, ground elevation 1,418 feet, on March 31 but had to shut down after setting surface casing at 485 feet. This site is 5½ miles east by south of the Souris Valley Williston Jeffrey 1-22 wildcat which found encouragement in the Mississippian limestone last fall, but was abandoned as non-commercial after production tests.

Three miles straight west of the Imperial Virden discovery, a small farmout of a section and a half from Canadian Superior Oil of California Ltd. to The Bay Petroleum Corporation has resulted in the staking of this company's first Manitoba wildcat, Bay-Canadian Superior Horn 4-12, lsd 4-12-10-27WPM, which will be drilled as soon as the road bans are lifted.

Thus the wildcat drilling program will be accelerated within a few weeks to a pace somewhat faster than the completion rate of the early summer period last year, but a considerable over-all increase in wildcat completions will be needed to overtake the gap left by the drastic reduction in the first four months.

Most of the current development drilling continued to take place in the Virden-Roselea field, where 12 of the 20 March completions were drilled, and in North Virden, which accounted for four more. In April, up to the third week, Virden-Roselea had seven of the eight development completions and a substantial number of additional sites remained to be drilled. This field is shaping up as a possible competitor to Daly for the total number of ultimate wells.

Mining in Canada

Bralorne Mines Ltd.

Drifting has been started by Bralorne Mines Ltd. on a strong vein 10 to 12 feet wide, which could be the easterly extension of the King vein, many hundreds of feet below the old King mine workings. It was these workings which paid Bralorne's dividends in the early years of the operation.

At last report the 20th level crosscut had picked up the vein some 30 feet from a diamond drill intersection which showed interesting values. The drift was being run in the direction of the drill intersection. At the point where the 20th level crosscut intersected this vein, assays showed gold content below ore grade, but strength of the vein structure and the nearby good drill hole intersection indicated it is worth exploration.

Bralorne's best oreshoot in the 32-year history of the operation was opened last year on the 26 level. Persistence of this oreshoot for its full length, with width and values almost maintained, is confirmed in the official report for the first quarter of 1955 down to the 28 level, 300 feet vertically below. The report also disclosed that on 27, the intermediate level, nearly half of the oreshoot has been opened with similar widths and values.

Values were found to be twice as high on 26 level as they were on 25 level. The 26 level oreshoot was opened for 1,158 feet and averaged 0.66 oz. gold per ton for an average width of 6.18 feet. The new report confirms that this oreshoot has been opened on 28 level, 300 feet below the 26, for 1,173 feet for which length it averages 0.64 oz. gold per ton across an average of 5.10 feet.

The 27 level at last report had been opened for 527 feet and for this length it averaged 0.61 oz. gold per ton across an average of 5.40 feet. Both the deeper levels were continuing in ore in both directions.

Deepening of the Queen shaft is continuing, and at March 31 it was down 830 feet below the 26 level. Pockets have been installed below the 31 level station and a crosscut to intersect the 79, 77 and 93 veins on this level has been started.

In the first quarter of 1955, Bralorne milled 43,633 dry tons to recover 16,058 oz. gold, an average of 0.37 oz. per ton. In the last quarter 1954 from 46,032 tons recovery was 15,704 oz., an average of 0.34 oz. per ton.

The company reported net profit of 12 cents per share in 1954, compared with 21 cents per share in 1953. Working capital was increased during 1954 from $1,524,798 to $1,724,864. Ore reserves at the end of 1954 were estimated at 620,000 tons of 0.456 oz. per ton, as against 644,000 tons of 0.443 oz. per ton a year previously.

Giant Mascot Mines Ltd.

Operating profit of $377,343 is reported by Giant Mascot Mines Ltd. for the six-months period ended March 31, 1955, from 99,717 tons milled, or $3.78 per ton. In the first half of the preceding fiscal year from 93,113 tons profit was half that at $186,269 or $1.97 per ton milled. Average price for lead was 15 cents per pound as against 12.2 cents per pound.

An all-time monthly record was set in March when from 17,246 tons averaging 4.35 per cent lead and 0.57 per cent zinc net smelter return was $138,523 or $8.03 per ton and operating profit was $79,093 or $4.57 per ton.

The shaft deepening program at last report had been carried to 50 feet above No. 9 level. H. L. Hill, consulting mining engineer, estimates that No. 9 level crosscut will be opened to the footwall ore zone by early July and that ore extraction from No. 9 level will start about mid-July. A third shaft was added to the shaft-sinking crew when the switch-over from diesel to hydro power was made April 11. A monthly saving of more than $7,500 is expected from the change-over.

Silver Standard Mines Ltd.

Silver Standard Mines has confirmed that its No. 11 vein was good gold-silver-lead-zinc cadmium ore across about two feet at the point of intersection by the 1,500 ft. elevation crosscut tunnel. Good ore at this location on No. 11 vein is significant in the long range picture for several reasons:

1. This intersection is 500 feet measured on the slope of the vein below the oreshoot opened on this vein from an exploration adit at 1,900 ft. elevation. On 1,900 level a drift opened 125 feet averaging 67.2 oz.

silver, 11.2 per cent lead and 15.1 per cent zinc, plus 0.085 oz. gold and 0.21 per cent cadmium across an average of 1.3 feet.

2. Allowing for the slope of the vein the new intersection on 1,500 elevation is about 500 feet distant along the vein from the rich oreshoot opened above, pointing to good length possibility.

3. Presence of ore at this depth is a further confirmation that Silver Standard may expect repetition of its orebodies under the major fault. This is the first vein to be explored to considerable distance at depth below the fault. Highly profitable oreshoots up to four and five hundred feet long were developed on several veins of varying widths above the fault.

Rico Copper Mines Ltd.

Preparations were made by Rico Copper Mines Ltd. to resume diamond drilling early in May in an effort to trace downward projection of very high grade surface copper exposures on its property on Mount Foley, 80 miles east of Vancouver.

Arrangements were made with Okanagan Helicopters Ltd. to employ a Sikorsky-55 to lift 50,000 pounds from a base camp at 4,000 ft. elevation to a landing space 300 feet above the tunnel portal at 6,500 ft. elevation. The loads will be carried in slings taking 1,200 pounds or more at a time. This method is expected to prove more dependable than the use of lighter helicopters employed last season. Gusts of wind at the high altitude often made it impossible for the light machines to land. With the Sikorsky sling loads it will be merely a matter of releasing the slings while the big helicopter hovers momentarily.

The drilling pattern will carry out recommendations of W. C. Ringsleben, consulting engineer of Toronto. Spotting the holes and supervising the program will be Dr. Victor Dolmage, Vancouver consulting geologist. Finances will again be provided in the form of advances by C. H. McNellen, Toronto manufacturer.

Jackson Basin Mining Co. Ltd.

Arrangements have been completed by Jackson Basin Mining Co. for acquisition of three silver-lead-zinc properties adjoining its Slocan district property, Arthur J. McClellan, president, announces. Known as the Bell, Sunset and Trade Dollar, these mines were partially developed by past owners. Their merger with Jackson Basin eliminates unfavorable boundaries and allows development of the known favorable areas from the most advantageous underground workings, Mr. McClellan states. Immediate diamond drilling was planned.

In the main Jackson workings two new development raises have been started from No. 6 to No. 5 level. Two samples from a raise from the west drift assayed 1.1 oz. silver, 22.8 per cent zinc across 27 inches; and 3.3 oz. silver, 3.1 per cent lead and 39.9 per cent zinc across 27 inches.

Canam Copper Co. Ltd.

Plans of Canam Copper Co. call for devoting all resources to developing the known ore from No. 6 adit to surface. Emphasis will be on blocking out sufficient additional ore to warrant a start of production on an initial basis of a minimum of 500 tons daily. The property is located near the Hope-Princeton Highway, 30 miles east of Hope.

Management hopes to prove as quickly as possible ore reserves of from 1,500,000 to 2,000,000 tons and make this ore available for milling. This would be sufficient for a 500-ton daily operation for eight years.

Good width of the orebodies will be conducive to low mining cost. When broken, the ore will fall through ore passes to be installed down to the mill level, about 1,000 feet below the surface outcrop. This drop will assist in crushing and breaking the ore, reducing mill costs.

Top of the ore zone is exposed in two impressive outcrops, one exposed for 500 feet with ends obscured by heavy overburden. No. 1 level crosscut showed 70 feet of ore averaging 1.55 per cent copper; 0.03 oz. gold and 1.03 oz. silver. No. 4 crosscut showed 70 feet also with values 1.58 per cent copper, 0.03 oz. gold and 1.51 oz. silver. No. 5 crosscut located 80 feet of ore averaging 1.48 per cent copper, and No. 6 level crosscut found 84 ft. width averaging 0.87 per cent copper. No assay for silver was taken on these last two.

Work to date has been concentrated on what is known as the north "nose" of the potentially productive ore zone. The fact that ore has been found well below No.10 level, 500 feet below No. 6, is reported to greatly increase the chances for a milling rate in excess of the initial objective.

Highland-Bell Ltd.

Highland-Bell Ltd. reports 1954 net profit of $38,862, compared with $142,186 in 1953. Net profit per share was 2½ cents against 9 cents, and sales were $485,955 against $596,233.

At the end of 1953 it was expected the remaining ore would be exhausted before the end of 1954, but enough ore extensions in old stopes were found to keep the mine going and officials report it may continue for several months. The long exploration tunnel is scheduled to be completed in July after which development will prove whether the company has a new mine.

Torbrit Silver Mines Ltd.

Net profit of $291,992 is reported by Torbrit Silver Mines Ltd., for 1954, equal to 9.5 cents per share on 3,000,000 shares issued. In 1953, a long strike shut-down caused a loss of $27,646. Revenue totalled $1,846,249 in 1954, compared with $1,072,217 in 1953. Tons milled were 150,235 compared with 71,862. Ore reserves at the end of 1954 are reported at 386,963 tons compared with 396,604 tons at the end of 1953. Working capital at Dec. 31, 1954, is shown at $681,785. The company initiated dividends in 1954.

Granby Consolidated

Rise in the price of copper has definitely extended the profitable lifetime of the Copper Mountain mine of Granby Consolidated, L. T. Postle, president, told the annual meeting. In addition to using open pit methods the company intended to treat about one million tons of "waste" averaging about 0.5% copper.

Chief efforts on outside properties will be directed to proving additional tonnage at the Granduc Mine in northwestern B.C., Mr. Postle said. As a result of the 1955 program he hoped to be able to report by the end of the year that thirty million tons of ore was indicated. One solution under consideration for the transportation problem is a proposal for a narrow gauge railway which might cost four or five million dollars.

Granby's exploration program this year will include drilling on a lead-zinc-silver property in eastern B.C. and further work at the Index copper property just south of the B.C. border in the State of Washington.

Granduc Mines Ltd.

In connection with the listing of the shares of Granduc Mines Ltd. on Toronto Stock Exchange, the company obtained a report from an independent consultant, B. S. W. Buffam, Toronto geologist.

Dr. Buffam gave his estimate of indicated ore, placing it at fifteen million tons. The company, making its calculation on basis of mineable ore, placed it at 9,500,000 tons averaging 1.5% copper.

In his review, Dr. Buffam said the two ore zones under development at present are estimated to contain approximately 15,000 tons per vertical foot at No. 1 adit horizon. His summary says that insufficient drilling has been done to prove the vertical continuity of this tonnage of ore, but that what has been done indicates it is highly

(Continued on page 38)

CAPITAL REPORT

by M. L. SCHWARTZ
Ottawa Correspondent

OTTAWA: Indicative of the opinion of management on the favorable outlook for marketing products of such operations, statistical and economics experts of the Canadian Government have estimated that intended investments in Canada's mining, quarrying and oil wells this year will show one of the sharpest gains of any sector of this country's economy.

This informed opinion indicates that capital and repair expenditures in mining, quarrying and oil wells will rise to $369 millions during 1955, including $237 millions for construction and $132 millions for machinery and equipment, as compared with $307 millions in 1954, including $186 millions for construction and $121 millions for machinery and equipment. In 1953, this programme involved $319 millions.

Capital expenditures planned for such operations in 1955 will reach $309 millions as against $249 millions in 1954 or $257 millions in 1953, and repair expenditures will rise to $60 millions in contrast to $58 millions in 1954 but below the $62 millions in 1953.

It is significant, too, this informed opinion holds that, while all such plans are always subject to a certain amount of adjustment, such as changing of original plans, adverse weather conditions, etc., there is reason to expect that the present program will be less affected by unfavorable factors than was the case in 1954. Labor, materials and investment funds are likely to be in adequate supply this year, the officials point out, adding that there may be an incentive for early completion of projects to a greater extent than a year ago. It is likely, too, officials explain, that prices having levelled off, actual costs will prove to be more in line with builders' present expectations and it is apparent that external economic influences are now more favorable than they have been for some time.

The firming of production and income trends in the United States and the continuation of prosperous conditions in the British Commonwealth and European countries should help to create an economic atmosphere favorable to further expansion in Canadian industries. This, of course, can provide an important stimulus to general activities in the mining industry of this country.

No Authority to Regulate

CANADIAN mining and allied industries can be informed that the Combines Branch here has no authority to regulate business or to lay down rules of any kind. Operators may note this to avoid misunderstanding about the work of this Combines Branch, which from time to time gets considerable publicity.

All the rules have been written into the legislation by Parliament itself, according to a spokesman of the Combines Branch, who defines its role in brief as being to investigate in accordance with the procedure established by the act, situations concerning which complaints have been made or which the director has reason to believe offend against the rules laid down by Parliament.

"The purpose of the rules is to maintain a competitive free enterprise economy in the belief that such a system, by harnessing private initiative, will produce the highest possible standard of living," this spokesman said.

Promotion of Research

AN M.P. presented a notice of motion in the House of Commons calling upon the Government to consider the advisability of setting up a special committee, representative of all political parties, with power to call witnesses and send for documents and papers, for the purpose of examining and reporting upon the advisability of providing inducements to promote and accelerate activities in the field of research.

This aroused widespread interest in the mining industry since many M.P.'s have been urging steadily that some weak links in the mining industry could be strengthened if much more official support was given to research and to efforts in general which can lead to increase the demands for many products of mining.

However, the motion has now been withdrawn because Trade and Commerce Minister Howe has declared that it is the intention of the Government to propose a committee to study not only atomic energy, but research generally.

Trend of Profits in Mining

A GOVERNMENT source has surveyed the trend of profits for corporations in mining, quarrying and oil well operations, disclosing that in the first three-quarters of 1954, such profits after taxes advanced to $112 millions in contrast to $108 millions in the same period of the preceding year, though below the $125 millions in the similar period of 1952 or $156 millions in 1951. However, the movement of such profits was upward in the past year, particularly in the latter part. By quarters, such profits showed, figures in brackets being for the previous year: 1st quarter, $28 millions ($37 millions); 2nd quarter, $43 millions ($40 millions), and 3rd quarter, $41 millions ($31 millions).

Sales of these corporations increased to $1,002 millions in this period of 1954 in contrast to $994 millions in previous year; net earnings increased to $250 millions from $227 millions less depreciation of $72 millions in contrast to $56 millions. Profits before taxes rose to $178 millions from $171 millions, less income tax liabilities of $66 millions in contrast to $63 millions; depletion charged reached $5 millions as against $4 millions.

Continuation of Coal Subventions

DESPITE announcement by the Government that it will continue its policy of subventions on the movement of coal, and increasing it in the case of coal from Alberta and the Crowsnest Pass district of British Columbia, and the official declaration that "it is expected these provisions will be of substantial assistance to the industry", there is much doubt in many quarters that this will be the case and it is felt something more should be done for the industry.

"I often wondered if coal, which exists in large quantities in New Brunswick and the neighboring province of Nova Scotia, has been investigated to its full potentiality as a steam generating facility", said an M.P. "What a boon for the Maritime Provinces if in the near future a method could be found whereby cheap power could be generated from steam. The matter should be studied further by the Research Council of Canada."

"Of course, part of the blame can be laid on this Government because of their policy in regard to the importation of foreign coal", remarked another M.P. who told how serious is the position of the coal industry in Alberta where the provincial Government had to allot some $100,000 to move miners to other employment.

Another M.P. from Western Canada told of the tragic happenings in his constituency where the Brazeau mine had been modernized and one of the finest briquetting plants installed. It is modern and well managed, he emphasized. In fact, the coal produced in that area was weather-resistant coal used for domestic heating, railway fuel and steam-raising in general, with the capital value of the installation being about $1.5 millions. However, in April last year about 200 men had to be laid off and then at the start of this year another 150 men lost their jobs when the mine was forced to close down. "Not only is it a tragedy from the standpoint of miners and their dependents, but personally I think it is a tragedy from the standpoint of the national welfare and safety," he commented, adding that within the last four years about 2,000 miners have lost their jobs in Western Canada as a consequence of mines closing.

"As we enter another year, the future of the industry remains generally sombre and cloudy, particularly for the small independent producer", declared an M.P. "According to the latest report of the Dominion Coal Board, the forecast is very much the same as before, namely, that in spite of the increasing competition from oil and natural gas, the increase of population and the expansion of industry, Canada will provide or is expected to provide sufficient markets by the middle sixties to enable the industry to survive, at least at its present level. This forecast, of course, does not take into account the present incalculable factor of atomic power."

"However", he continued, "from that forecast I think we may reasonably hope that the industry is not necessarily doomed to extinction for lack of markets. But the next decade will be a critical one. It will require a continued flow of governmental assistance and co-operation to enable the industry to stagger through to better days. Not only in the interest of the coal-producing provinces but in the national interest as well, it is imperative that this assistance and co-operation be continued and, if necessary, expanded. We have only to remember that coal is still the chief source of energy in Canada, that it is still an essential in time of war, and that mines, if they are once closed, will in all probability never re-open.

"What form of assistance may prove most effective is not an easy question to answer, even for experts", he stressed. "It may prove to lie in the realm of the development of new and commercially practicable uses for coal other than as fuel. That has always been a favorite thesis of my own. It may be found elsewhere. The ultimate answer will probably be a composite of many factors".

News Roundup

CHEAPER transportation is needed to develop the great potential mineral wealth of Canada's north country, M. A. Hardie, M.P. for the new Mackenzie River riding, told a meeting in this capital, adding that before the coming of air travel, canoe and dog team were the main means of transportation . . . In reply to a question, a Canadian Government spokesman has indicated that no coal has been shipped from Canada to the United Kingdom in the first eleven months of the past year . . . Discovered by Canadian, British and French engineers, the development of rich iron ore fields in French West Africa is being hampered by a touchy international situation, according to Dr. Duncan R. Derry, who spoke to the Canadian Institute of Mining and Metallurgy here. He was discussing the recent discovery of high grade iron ore near Fort Goroud in the Sahara Desert. In order to transport the ore for processing, it had to be carried over 200 miles of Spanish territory and "the relations between French and Spanish colonial officials are anything but friendly", he emphasized. There are at least 100 million tons of ore in the area, he reported. . . . Asked if the Department of Northern Affairs and National Resources has any plans to use the landing strips erected in connection with the D.E.W. line and radar defence stations for exploration and development work throughout the northern areas, a Government spokesman said "to whatever extent it is possible" . . . Col. E. D. Baldock, Chief Cartographer, Department of Mines and Technical Surveys, told of advances in the use of aerial photographs as the first step in map making, adding that 17% of the country has been accurately photographed. He also pointed out that all NATO countries now are using the same scale for maps, making them uniform. . . . A. R. Crozier, Chairman of the Ontario Fuel Board, said here that natural gas is today supplying 25% of the U.S. requirements of fuel and energy and forecast, as his opinion, that with new pipe line supplies from Alberta fields and U.S. sources, Ontario will likely be using natural gas for 25% of its fuel energy within the next 10 to 15 years.

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METAL MARKETS

Copper Consumption Reaches New Peacetime Peak, Zinc Prices Up, Lead Market Continues Firm.— Government Stockpiling Gives Strength to Markets.— Aluminum at All Time High.

NEW YORK—The domestic metal industries are keeping pace with the nation's near-record economic activity. U.S. copper consumption has attained a new peacetime peak; strong demand for zinc brought higher prices, and the lead market remains firm. And the immediate outlook is for more of the same.

There was no change in the domestic price of copper last month despite the see-sawing in London resulting from the release by the British Board of Trade of 65,000 tons of copper from government holdings. The metal was freed in an attempt to alleviate the shortage of copper and to help stabilize the market. However, at this writing, the price of copper in the United Kingdom is still about 2 cents above the 36-cent level established in this country.

The March consumption of refined copper by domestic wire mills, brass mills and foundries amounted to 142,776 tons, a gain of 23,999 tons over February and a peacetime record high. Industry sources explain the sensational March shipments as representing in part an attempt to beat the anticipated copper price rise. Another factor may have been hedging in some quarters against possible labor difficulties. However, brass and wire mills report that their business in March was 40 per cent greater than in the corresponding period of last year.

Although makers of copper and brass products expect business to continue brisk over the next few months, the March consumption figure is not taken either in producing or consuming circles as an indication of what the monthly consumption is likely to be over the balance of the year even if there is no strike in the auto industry. If use of copper averages between 120,000 tons and 125,000 tons a month, it is believed the fabricating industry will be doing very well.

Most industry sources expect that copper supply and demand will be in approximate balance by the fourth quarter of this year. They point out that domestic mine output and custom intake are likely to provide about 110,000 tons of copper a month. It is estimated that Chile's output will be boosted to about 40,000 tons a month and that by October at least 20,000 tons of that total will be coming to the U.S. (Chile is reported to have sold out its output through September of this year). Thus the domestic fourth-quarter copper supply from current output and from imports is placed at around 130,000 tons.

Copper demand abroad meanwhile continues heavy. The U.S. restrictions on exports of refined copper and of scrap copper have cut off an appreciable supply to Europe and Western Germany is reported to have been especially hard hit. That has made it possible for British metal merchants to obtain higher prices on the Continent.

The latest U.S. curb is the extension of second-quarter copper export licensing restrictions to apply to refined copper produced from scrap of Canadian origin. This means that such exports generally will not be approved. Exports of refined copper produced from materials of foreign origin other than Canadian scrap will continue under open-end licensing. The new limitation was imposed to prevent excessive drain through the U.S. of Canadian scrap required for U.S. or Canadian use.

While clamping down on exports, the U.S. apparently will continue the open-door policy for imports. Four Government agencies have urged Congress to suspend the 2 cents a pound copper import duty until June 30, 1958. The current suspension is slated to expire June 30, 1955. Renewal legislation contains the present clause that the duty would be reimposed if the copper price falls below 24 cents for any one calendar month. Incidentally, the U.S. net copper imports (imports less exports) came to 20,188 tons in February against 22,116 tons in January. Last year the net imports averaged 30,500 tons a month and for the first two months of 1955 the average is 21,152 tons.

Govt. Buying Strengthens Zinc, Lead

UNLIKE the situation in copper, the lead and zinc markets depend on government stockpiling for at least part of their strength. In this regard producers were encouraged by reports that the General Services Administration intends to continue buying these metals beyond the June 30, 1955, date mentioned by President Eisenhower when the current program was launched. It will be recalled that the President, in lieu of boosting tariffs, authorized the Office of Defense Mobilization to arrange for buying up to 200,000 tons of lead and 300,000 tons of zinc in the current fiscal year.

While it is clear that ODM won't reach these goals by June 30, it is anticipated that the Government will keep right on buying lead and zinc until the targets are hit—unless, of course, market prices climb to such an extent that the Government feels further purchasing is not warranted. Also, it is reported that the Government intends to continue buying both metals at prevailing prices until the total combined cost of lead and zinc amounts to over 28 cents a pound. At present, with lead at 15 cents and zinc at 12 cents, the combined level is only 27 cents. Thus, if the Washington rumors resemble the facts, there is still some leeway price-wise before stockpiling would be suspended.

However, even if federal buying should be halted temporarily, the long-term goals would remain intact. The prospect of such additional purchases at a later date if prices soften should provide producers with some protection against a precipitous drop in demand for lead and zinc. It is believed that ample funds are available to sustain the stockpiling program into the next fiscal year.

Meanwhile, as an indication of the strength of the market, lead purchases by the Government in April were substantially less than half the amounts offered in previous months because of large consuming demand. During the latter part of 1954 and earlier this year, the GSA was able to buy about 10,000 tons of lead each month for the stockpile.

At present, lead consumption is estimated at somewhere between 100,000 and 105,000 tons a month. Counting the 10,000 tons monthly the Government is prepared to acquire, an outlet is provided each month for around 110,000 to 115,000 tons. The supply of lead from domestic mines, from scrap recovery and from imports comes to only about 90,000 to 95,000 tons. Producers have made up the deficit by drawing on their own reserves. Last year producers' stocks of lead stood at 109,302 tons at the end of May whereas at the end of March, 1955, they were down to 59,881 tons.

Domestic output of primary and secondary lead in March came to 50,309 tons, a gain of 10,135 tons over February. For the first quarter, output totalled 135,261 tons against 141,372 tons in the like 1954 period. Domestic shipments decreased 4,264 tons to 42,381 tons in March. However, first-quarter shipments amounted to 129,477 tons against 121,496 tons in the 1954 period.

After holding steady since September 3, 1954, the zinc price moved up a half-cent last month to 12 cents a pound for Prime Western at East St. Louis. The advance did not come as a great surprise to the trade since demand had been quite persistent. Among the major consuming fields, galvanized sheet output has been very large; use of zinc in die casting has received a "shot-in-the-arm" by record auto output and brass mill activity has been at a high level.

While consumers of Prime Western can get all the metal they want, the situation is quite different as far as Special High Grade is concerned. Efforts to obtain more Special High from foreign sources are not proving very successful because of the higher prices that this grade commands abroad.

The statistical position of zinc, while greatly improved over last year, is not as good as it is in lead. The difficulty lies in the fact that domestic production, now at an all-time high, and net imports create a supply of about 100,000 tons a month while consumption is somewhere between 85,000 and 90,000 tons a month. If the Government had not been siphoning off approximately 15,000 tons a month for the stockpile, producers' stocks of zinc would have increased rather than decreased. As it is, stocks, which were at a record of 208,828 tons at the end of May, 1954, were down to 90,837 tons at the close of March, 1955.

U.S. production of all grades of zinc in March came to 89,179 tons, a gain of 10,202 tons over February. Shipments of all grades totalled 94,507 tons as compared with 99,964 tons in February, a decline of 5,457 tons despite the fact that March was a longer month.

Aluminum At All-Time High

PRIMARY aluminum production set new all-time highs in March and in the first quarter. March output of primary aluminum came to 260,543,479 pounds, an increase of 28,070,480 from February and 15,865,130 tons more than the 244,678,349 pounds produced in March of last year. In the first quarter of 1955, output totalled 749,423,226 pounds, a gain of 2,670,983 pounds from the 746,752,243 pounds produced in the final quarter of 1954, the previous record high.

Silver Price Down

SILVER prices were cut 1.50 cents last month to 87 cents an ounce at New York. Output of refined silver in the U.S. totalled 5,604,000 fine ounces in February compared with 6,541,000 ounces in January, a decline of 937,000 ounces. In the first two months of this year, production amounted to 12,145,000 ounces, a drop of 858,000 ounces from the 13,003,000 ounces turned out in the corresponding 1954 period.

Quicksilver Demand Limited

THE quicksilver market was flabby last month with trading on the dull side. There was little consuming demand and spot European metal at the close was quoted at $315 to $318 a flask against $320 to $323 last month. Spot supply in view of the lack of demand, is rather large. However, some factors indicated that the market might firm if one or two large consumers resumed purchases.

Titanium Production Up

OUTPUT of titanium mill products in the U.S. amounted to 797,219 pounds in the first quarter of 1955, an increase of 28,653 pounds over the 1954 fourth quarter. Production of titanium mill products domestically totalled 2,598,300 pounds in 1954 compared with 2,227,500 pounds in 1953.

Parker Named Vice-President of International Nickel

RALPH D. PARKER, of Copper Cliff, Ontario, has been elected a vice-president, and Walter A. McCadden comptroller, of The International Nickel Company of Canada, Limited, Dr. John F. Thompson, chairman of the board, announced following the annual organization meeting of the board of directors.

Frederic Benard and G. Alan Harcourt have been elected assistants to the vice-president and Walter O. Hardacre assistant works auditor.

Mr. Parker continues his existing post of general manager of Canadian Operations. He came to International Nickel in 1928 from McIntyre Porcupine Mines, becoming superintendent of Inco's Creighton Mine, near Copper Cliff, then superintendent of Frood Mine, and subsequently superintendent of mines. In 1935 he was appointed general superintendent of the Mining and Smelting Division and in December, 1947, to the additional post of assistant vice-president of The International Nickel Company of Canada, Limited. Mr. Parker is president of Canadian Nickel Company, Limited, exploration and prospecting subsidiary of Inco.

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M. MASTERSON,
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MINERAL LAW TO DATE

By RICHARDSON, RICHARDSON, McLACHLAN & NORTON, Barristers and Attorneys-at-Law, Winnipeg, Manitoba

TRANSFER OF MINERAL RIGHTS BY MORTGAGOR IN CONSIDERATION OF EXTENSION OF TIME FOR PAYMENT OF MORTGAGE: Young vs Kinnis (1954) 11 W.W.R. (NS) 436 (Man.)

The plaintiff Young mortgaged his farm to the defendant. He made no payments except one payment of interest. After much correspondence and negotiation he gave Kinnis a transfer of Mineral rights on and under the land in question in consideration of an extension of time granted to him by Kinnis for payment of the arrears. No payment having been made within the extended time Kennis commenced sale proceedings. Kinnis later died and the plaintiff Young then commenced this action against Mrs. Kinnis as administratix of the estate alleging that he, the plaintiff, an illiterate man, had been induced to give the transfer by undue influence, by pressure of sale proceedings, fear of possible loss of his land and by representation that the transfer of the mineral rights was merely an additional security to Kinnis and would not be registered. He further alleged the transfer had been signed in blank and certain ommissions had been filled in and completed without his consent, and that his wife had not consented to the transfer. He claimed a declaration that the transfer was null and void or, in the alternative, that it was in reality a mortgage of the minerals and subject to redemption, and also further relief. The defendant counterclaimed for payment of the amount due under the mortgage.

It was held that there was no rule in equity that a mortgagee cannot stipulate in the mortgage deed for a collateral advantage to endure beyond redemption provided that such collateral advantage is neither unfair or unconscionable, or in the nature of a penalty clogging the equity of redemption, or inconsistent with or repugnant to the contractual or equitable right to redeem. Held further that the application of the rule against clogging the equity of redemption is confined to agreements contemporaneous with the giving of the mortgage. The mortgagor may abandon his equity of redemption. A conveyance of the mineral rights in the land given for an executed consideration, namely an extension as to time for payment of the mortgage debt, cannot be a clog on the equity of redemption. Held further that where there was no suggestion that the transferee, Kinnis, had knowledge of any untruth in statements in a certificate of acknowledgement of the wife's consent to transfer as required by Section 8 of the Dower Act, testimony that the wife did not consent was inadmissible in an action against the transferee by the transferor. The consideration of the transfer of the mineral rights was not a penalty within the prohibition of the Interest Act.

The plaintiff's action was dismissed with costs and the counterclaim allowed with costs.

Mining in Canada

(Continued from page 33)

probable that ore persists for a vertical range of at least 1,000 ft. He adds that if the proposed underground development work is successful in proving this vertical continuity of the ore then approximately 15,000,000 tons would be established within the area presently explored in the No. 1 adit. Dr. Buffam advised further that in his opinion a mining reserve of 30,000,000 tons of proved and probable ore would be required before detailed plans could be made to place the property on production. There was a good possibility, he said, that the objectives of the present program would be attained by completion of the proposed work.

The 1955 program at Granduc got underway ahead of schedule with the successful delivery over a 25-mile snowbound route of nearly 1,000 tons of mining supplies and equipment by tractor train. Patricia Transportation Co., utilizing methods learned by experience in northern Manitoba and Ontario, moved the heavy loads across three glaciers.

Rexspar Uranium

Approximately $20,000 monthly is being spent by Rexspar Uranium and Metals Mining Co. Ltd. on underground development of "A" zone, reports J. B. Aird, president. Mr. Aird says the company is confident that a profitable uranium operation can be developed at its property north of Kamloops, B.C.

Engineering studies are being made regarding mining and milling costs and methods. Favorable factors affecting costs are the size, open-pit mining opportunities and accessibility. On BD zone the program has outlined a thick lenticular orebody capable of open-pit mining and estimated to contain in excess of 500,000 tons of uranium ore.

Silver Hill Mines Ltd.

New financial arrangements in April resulted in resumption of work at the mine of Silver Hill Mines Ltd. near Tulameen, B.C., with the objective of initiating silver-lead-zinc production by mid-summer. Officials report that indicated ore of at least 65,000 tons has gross value of approximately $3,500,000 at present metal prices. This makes no allowance for ore below No. 2 level or in the separate Jensen adit. They point out that downward continuance of the ore to No. 3 level, 400 ft. vertically below No. 2, has been established. The 50 to 60 tons daily capacity mill was near completion when work stopped in November for the winter.

Waddington Mining Corp.

Permission has been granted by the B.C. government to Waddington Mining Corp. Ltd. to carry out surveys to establish the practicability of its proposals for hydro-electric power development on a number of watersheds at the head of Bute Inlet, 150 miles north of Vancouver. The company is seeking the power rights in connection with plans for metallurgical industries and related projects.

Provincial Lands Minister Robert Sommers has told the company that a reserve still exists on the various watersheds in favor of the Crown. However Waddington can proceed with surveys and when more accurate and concrete proposals are available will be in a position to determine if it wants to make a formal application for a water licence. The survey will include stream discharge measurements, dam cross-sections, river profiles and pondage plans.

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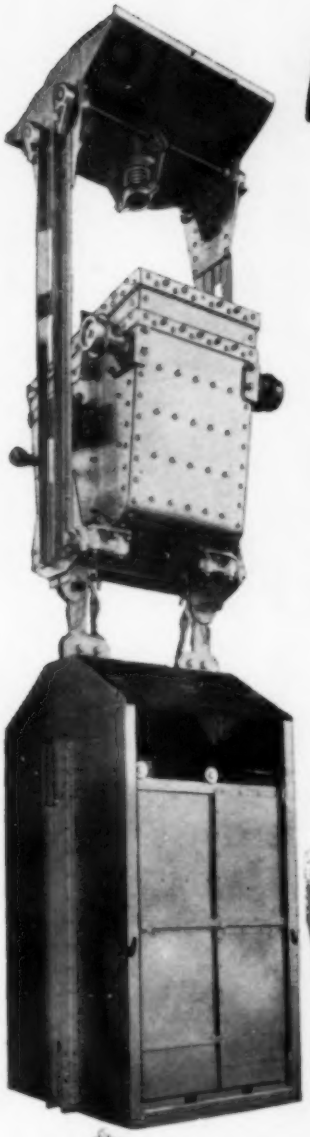

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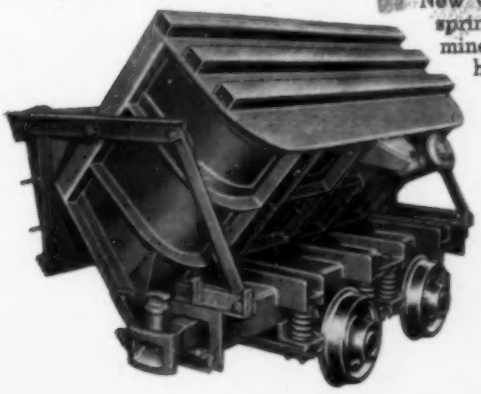

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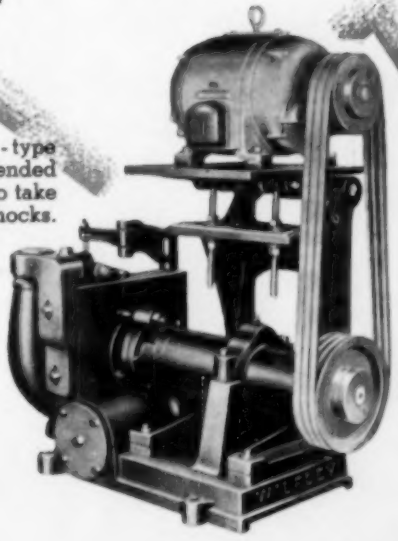

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